Chem

Chemistry
UG
441
.A2
A73

THE UNIVERSITY
OF MICHIGAN
JAN 30 1963

CHEMISTRY
LIBRARY

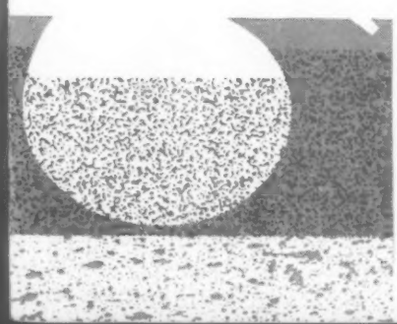
ARMED FORCES CHEMICAL JOURNAL 5

THANKS ARMY..

Navy, Air Force and the other Federal agencies who participated in the sixteenth annual meeting

..FOR A WONDERFUL TIME

16 *page picture story*
16*th annual meeting*



ARMED FORCES CHEMICAL ASSOCIATION

1025 Connecticut Avenue, Washington 6, District of Columbia

Telephone 347-4648

THE Armed Forces Chemical Association is a patriotic, educational, scientific, nonpolitical and nonprofit-making organization of citizens of the United States of America dedicated to scientific and industrial preparedness for the common defense in the fields of chemical, biological, radiological and related technology, commonly referred to as chemicals. Objectives of the Association are to encourage chemical research and development, among private, industrial, educational, and research organizations in cooperation with the agencies of the Department of Defense. To bring to the people of our country the knowledge for the necessity of scientific and industrial preparedness; and to encourage adequate military training throughout the Nation and the upbuilding of adequate enlisted and commissioned Reserves; to assist in developing and maintaining adequate personnel, both commissioned and enlisted, for the requirements of the Military Establishment and Civil Defense in the event of an emergency. In pursuit of these objectives, the Association will provide, when required, the services of competent committees to investigate and report on special chemical subjects; will promote mutual understanding between American scientists, inventors, engineers, and manufacturers in civil life, and personnel of the Armed Forces. And, the Association will cooperate with all agencies of the Government in planning mobilization and untilization of the Nation's scientific and industrial resources for the national security.

NATIONAL OFFICERS

President
MR. SIMON ASKIN
New York City

Vice President for Mobilization
MAJOR GENERAL CHARLES E. LOUCKS
Washington, D.C.

Vice President for Chapters
MR. ROBERT J. MILANO
New York City

Vice President for Civil Defense Planning
COLONEL VICTOR SEARLE, USA
McClean, Virginia

Vice President for Finance
COLONEL ROBERT T. NORMAN
Washington, D.C.

Vice President for Public Relations
MR. G. M. GLIDDEN
South Haven, Michigan

Vice President
MR. W. WARD JACKSON
New York City

Vice President for Meetings
MR. DONALD MacARTHUR
Washington, D.C.

Vice President for Technical Committees
REAR ADMIRAL M. P. HOTTEL
Washington, D.C.

General Counsel
MR. CHARLES E. PLEDGER, JR.
Washington, D.C.

Honorary President

MAJ. GEN. MARSHALL STUBBS
Chief Chemical Officer
Department of the Army
Washington, D.C.

Immediate Past Presidents

DR. WENDELL F. JACKSON
Wilmington, Del.

BRIG. GEN. CLIFFORD L. SAYRE
USAR (Ret.)
New York, N. Y.

Association Staff

MR. EDGAR L. NEWHOUSE, III
Executive Director

LT. COL. O. E. ROBERTS, JR.
Secretary-Treasurer

MR. DALLAS HALVERSTADT
Editor

Chapter Presidents and Secretaries

CHESAPEAKE—*Pres.* JOHN FONNER, Pres., Diamond Alkali Co., P. O. Box No. 655, Edgewood Arsenal, Md.; *Secy.* COLONEL ASHER COHEN, 4000 Forest Park Ave., Baltimore 7, Md.; *Treas.* GLENNON L. DEROY, 949 Chesapeak Drive, Harve de Grace, Md.

CINCINNATI—*Pres.* L. CALVIN PALMER, Pres., Vulcan-Cincinnati, Inc., 120 Sycamore Street, Cincinnati 2, Ohio.

CLEVELAND—*Pres.* D. H. ANDREWS, Monarch Aluminum Mfg. Co., Cleveland 2, Ohio; *Secy-Treasurer* L. R. MANNING, H. K. Ferguson Co., 1783 East 11th St., Cleveland 14, Ohio.

DALLAS—LT. COL. Herman DORN, USAR, (Ret.), 6161 Preston Haven Drive, Dallas 30, Tex.; *Secy-Treasurer* JACK C. JONES, 1114 Commerce St., Dallas 2.

FORT DETRICK—*Pres.* MAJOR EUGENE J. CRONIN, JR., Cml C, Fort Detrick, Frederick, Md.; *Secy-Treas.* EVERETT HANEL, JR., Safety Division, Ft. Detrick, Frederick, Md.

FORT McCLELLAN—*Pres.* LT. COL. J. C. HIETT, Hqs., USA Chemical Corps Trg Cmd, Fort McClellan, Ala.; *Secy-Treas.* MAJOR JACK C. FESSENDEN, Chemical Corps School, Fort McClellan, Ala.

GA. TECH STUDENT CHAPTER—*Pres.* STEVE BRADFORD, Box 863, Ga. Tech, Atlanta 13, Ga.; *Secy-Treas.* WOODY W. PIPER, Box 863, Ga. Tech, Atlanta 13, Ga.

MEMPHIS—*Pres.* PAUL J. TRAUT, 192 Dille Place, Memphis, Tenn.

MIDWEST—*Pres.* HOYT M. CORLEY, 1st V. P., Armour & Co., Armour Industrial Chemical Co., 110 N. Wacker Drive, Chicago 6, Ill.; *Secy-Treas.* JAMES J. DOHENY, American Chemical Society, 86 E. Randolph St., Chicago 1, Ill.

NEW ENGLAND—*Pres.* HARRY A. WANSKER, Government Relations Director, United-Carr Fastener Corp., Kendall Square Bldg., Cambridge 42, Mass.; *Secy.* JOHN H. ADAMS, ITEK Corp., Waltham, Mass.; *Treas.* LT. COL. CHENERY SALMON, Coffin & Burr., 60 State St., Boston 9, Mass.

NEW YORK—*Pres.* ROBERT J. MILANO, Pres., Milmaster Chemical Corp., Ninety-nine Park Avenue, New York 16, N. Y.; *Secy-Treas.* JOEL HENRY, American Institute of Chemical Engineering, 25 West 45th St., New York 36, N. Y.

PINE BLUFF ARSENAL—*Pres.* CONRAD J. B. HARDY, Pine Bluff Arsenal; *Secy-Treas.* EDW. WOODFORD, 220 S. HARRISON, Little Rock, Ark.

PITTSBURGH—*Pres.* FREDERICK C. HICKEY, Sales, Engineer, Defense Products Dept., Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.; *Secy-Treas.* CHARLES A. KIERNAN, c/o Federal Labs, Saltsburg, Pa.

ROCHESTER—MAJOR HENRY T. PERKINS, 47th & N. Clinton Ave., Rochester 4, N. Y.

ROCKY MOUNTAIN—*Pres.* LT. COL. LAWRENCE M. DELLINGER, Rocky Mountain Arsenal, Denver 30, Colo.; *Secy-Treas.* CLARENCE WESTENBERG, 1638 S. Clarkson St., Denver 10, Colo.

SOUTHERN CALIFORNIA—COL. SAMUEL P. PICKETT, 9718 S. LaAlba Drive, Whittier, Calif.; *Secy-Treas.* MAJOR T. J. McENIRY, 573 La Paz Drive, San Marino, Calif.

WASHINGTON, D. C.—*Pres.* WALTER G. WINSLOW, Aero-Jet General Corp., 1120 Conn. Ave., N. W., Washington, D. C.; *Secy-Treas.* MYRON A. WARNES, Koppers Co., 1725 K St., N. W., Washington 6, D. C.

WILMINGTON—CLAUDE A. BUNNELL, Liquid Nitrogen Processing Corp., 412 King Street, Malvern, Pa.; *Secy-Treas.* DR. W. H. MANOGUE, Eastern Laboartory, E. I. du Pont de Nemours & Co., Gibbstown, N. J.

Chemicals you live by

Diamond produces the "Chemicals you live by" . . . for industrial and agricultural purposes, consumer use, and for our national defense. Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.

Agricultural Chemicals

DDT (Technical and Concentrates)
BHC (Technical and Concentrates)
2,4-D (Acid, Salts, Esters and Formulations)
2,4,5-T (Acid, Salts, Esters and Formulations)
Dacthal*
Crop Rider*
Fence Rider*
Line Rider*
Lindane (100% and Concentrates)
Ovex Miticide (Technical and Concentrates)
Hexachlorobenzene (Technical and Formulations)
Grain Fumigants
Dacthal*
Diamond "80-20"*
Diamond "75-25"
Mill Brand "H," "R," and "S"
Premium Brand "A"

Basic Alkali Products

58% Light Soda Ash
58% Dense, Granular Soda Ash
Foundry Grade Soda Ash
Soda Ash Briquettes
SPL-ASH

Bicarbonate of Soda, U.S.P. Powdered, Granular
Bicarbonate of Soda Free-Flo*
Sesquicarbonate of Soda
Modified Sodas
Sal Soda Concentrate
Caustic Soda
Solid, Granular, Flake, Crystal
Liquid Caustic Soda
50% NaOH
73% NaOH
Liquid Caustic Potash

Calcium Carbonates

Precipitated Calcium Carbonates for Paint, Rubber, Plastics, Glass, Printing Ink and Foods:

Suspenso* Surfex MM*
Millical* Multifex-MM*
Non-Fer-Al* Super-Multifex*
Surfex* Kalite*
U.S.P. Dense Carbium* (Food Grade)

Cement and Coke Products

Portland Cement
Masonry Cement
High Early Strength Cement
Waterproof Gray Cement
Foundry and Industrial Coke
Crude Ammonia
Tar

Chlorine

Liquid Chlorine
Single-Unit Tank Cars
Multi-Unit Tank Cars
Barges and Pipeline Cylinders

Chlorinated Products

Muriatic Acid (Commercial and Water White) Tank Cars
Anhydrous Hydrogen Chloride
Carbon Tetrachloride Tank Cars and Drums
Chlorowax* 70 and 70S (Resinous Chlorinated Paraffins)
Chlorowax* 40, 50, LV and HV (Liquid Chlorinated Paraffins)
Perchlorethylene
Trichlorethylene
Ethylene Dichloride
Methyl Chloride
Methylene Chloride
Chloroform
Hexachlorobutadiene
Fire Extinguisher Liquid
Chloral
Dimethyl Tetrachloroterephthalate
Xylene Derivatives
Isophthaloyl Chloride
Terephthaloyl Chloride

Chromium Chemicals

Alumina Hydrate
Sodium Bichromate
Crystal, Granular, Liquid, Anhydrous
Sodium Chromate
Crystal, Liquid, Anhydrous
Potassium Bichromate
Chrome Salt Cake
Chromic Acid
Tanolins* (Tanning Salts)
Synthetic Tans
Tanning Oils and Fat Liquors
CPA 1800* (Chrome Plating Additives)
Basic Chromic Chloride

Industrial Detergents, Cleansers and Chemicals For Food, Dairy and Beverage Plants

Bomber*
Cirkal* (for Mechanical and Circulation Cleaning)
Cleaner and Cleanser
Diamid* (Liquid Acid Cleaner)
Diamond Soda Crystals
Dreadnaught* Cleaner
Economy Cleaner
Special Alkalies (Causticized Ash, all strengths)
Special Alkalate
Hardnox Alkali* (Bottle Washing)
Hi-Speed* Cleaner
Hi-Test Alkali* (Bottle Washing)
Horizo* (Chlorinated Phosphate-type Sanitizer)
HW Soaker Alkali* (Bottle Washing)
Diamond Detergent
Hydrolate* Hydrobreak*
All-Purpose "W"* Cleaner
Compounds for Specific Uses
Modified Soda
BB Soaker Alkali (Bottle Washing)
Clipper Cleaner*
CH-100* and CH-101 (Bottle Washing)
Powdered Acid Cleaner
Samson* Can Washing Compound
Sequet*
Neutral 50* Cleaner
Nutralac Sesquilate*
Hi-Ratio Silicate*
Sodium Metasilicate, Anhydrous
Sodium Metasilicate, Pentahydrate
Sodium Orthosilicate
Supersilicate*
Iokel Superkel*
Nu-Met* Suplex*

For Laundries

Laundry Soda
Diamond Soda Crystals
Laundry Sours
Laundry Liquid Blue
Hi-Ratio Silicate*
Hydrobreak* Hydrolate*
Paralate* Paralate* S
Alkalate* Metalate
O&W Compound*
Orthobrite*
Ortholate
Sodium Metasilicate, Anhydrous
Sodium Metasilicate, Pentahydrate
Sodium Orthosilicate
Supersilicate*
Suspensoil*
58% Soda Ash
Washroom Control Kit

Plastic Resins and Compounds

Polyvinyl Chloride Resins
Diamond PVC-500 (High Molecular Weight—U. L. Approved)
Diamond PVC-450 (Medium Molecular Weight)
Diamond PVC-30, PVC-35 and PVC-40 (Low Molecular Weight)
Diamond PVC-60 and PVC-62 (Cold Blend)
Diamond PVC-70 and PVC-70F (Dispersion Grade Resins)
Compounds
Diamond Compound R4 (for Rigid PVC Applications)
Compounds for Specific Applications
Flooring Grade Resins
Copolymer Resins
CR-80 and CR-85

Sodium Silicates

Silicate of Soda, Liquid
All Grades
Water White, 42°
Silicate of Soda, Concrete Special
Versilad* and Versilate* (Adhesives)
Silicate of Soda, Glass
Detergent Silicates
Moroc* Foundry Sand Binder
Sodium Metasilicate, Anhydrous
Sodium Metasilicate, Pentahydrate
Soil Stabilizers

Other Diamond Chemicals

Delozin* (Zinc Electropolishing Compound)
Di-Aqua* (Wetting Agent)
Hydrogen

*Reg. U. S. Pat. Off.

Diamond Chemicals

Armed Forces CHEMICAL JOURNAL

OFFICIAL PUBLICATION OF THE ARMED FORCES CHEMICAL ASSOCIATION

1025 CONNECTICUT AVENUE, N. W., WASHINGTON 6, D. C.

VOLUME XV | SEPTEMBER-OCTOBER, 1961 | NUMBER 5

POLICY

The fact that an article appears in this magazine does not indicate approval of the views expressed in it by any one other than the author. It is our policy to print articles on subjects of interest in order to stimulate thought and promote discussion; this regardless of the fact that some or all of the opinions advanced may be at variance with those held by the Armed Forces Chemical Association, National Officers, and the Editors. It is the responsibility of contributors, including advertisers, to obtain security clearance, as appropriate, of matter submitted for publication. Such clearance does not necessarily indicate indorsement of the material for factual accuracy or opinion by the clearing agency.

Editor
Dallas C. Halverstadt

Defense Chemistry in the News
Dr. William T. Read, Sr.

Advertising Director
Lt. Col. O. E. Roberts, Jr.
USAR-(Ret.)

Front Cover
By Charles Mendez

Photographs for this annual meeting issue were made by Frank Alexander and Francis Federici of Merkle Press Inc.

CONTENTS

Askin Welcomes AFCA 4

Stahr Outlines Army Policy 6

Advance Registrations 10

Creating Balanced Military Power—By General Clyde D. Eddleman 12

Shall We Join the Ladies?—By Captain Rebecca Bennett 14

Photo Story ..... 15 thru 30

Balanced Arsenal Balanced Power—By Major General Marshall Stubbs .. 31

New Development—By Rear Admiral K. S. Masterson 37

Address—By Edward A. McDermott, Deputy Director, OCDM 41

ADVERTISERS

Columbia-Southern Chemicals, Pittsburgh Plate Glass Company . . Back Cover

Delta Chemical Works 43

Diamond Alkali Company 1

The Dow Chemical Company 7

The Harshaw Chemical Company 11

Hooker Chemical Corporation 10

The Lummus Company 5

Mine Safety Appliances Company 3

Published bi-monthly—January-February; March-April; May-June; July-August; September-October; November-December; by the Armed Forces Chemical Association, National Headquarters, located at Suite 408, 2025 Eye St., N. W., Washington 6, D. C. Second Class Postage paid at Washington, D. C. Subscription price $3.00 per year to members; $6.00 per year to non-members in the United States, Canada and Mexico; elsewhere $1.00 additional for postage. Printed by Merkle Press Inc., Washington, D. C. Inquiries concerning circulation and advertising should be addressed to the Secretary-Treasurer.

Scientists research constantly to improve or design new safety equipment . . .

Tool-makers, with experienced hands, skillfully manufacture production tools . . .

Inspectors, sharp-eyed and trained, check every component and each assembly . . .

Technicians assemble and test instruments to detect explosive and toxic atmospheres . . .

Machinists with precision tools shape metals to meet vital tolerances . . .

Millers and mixers process crude rubber to assure the quality of rubber products . . .

MSA taps a variety of special skills to meet the requirements of government projects

There's a well-established source of knowledge and skills available—at MSA—for carrying out government contracts in research, engineering and production.

Many of these talents have already been employed on a wide range of government projects. Many more are at work full-time on the development and production of our complete line of safety products, numbering over 3600 in total.

Years of work in an environment of "safety firsts" provides MSA employees with a special knack for meeting rigid specifications. We'd be happy to submit our qualifications in detail for your evaluation. Write our Defense Products Department for more information.

MSA
SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue
Pittsburgh 8, Pennsylvania

At Your Service: 76 Branch Offices in the United States

Askin Welcomes AFCA

Opens Annual Meeting

IT IS MY PRIVILEGE to welcome you to the 16th Annual Meeting of the Armed Forces Chemical Association.

First and foremost, I do want to thank the Army for acting as our Host Service and for their cooperation in making available to us the various speakers who will participate in the series of meetings to take place during the next two days. My gratitude also to each and every one of you who are giving of your time and efforts in all phases of this program.

We have a multi-faceted program for the next couple of days, but in reality we have only one subject—SURVIVAL.

Here then is a **Seminar in Survival** from which each of us—in Military, Government or Industry service—should derive maximum enlightenment.

Our new Constitution now broadly defines the purposes of our Association as "dedicated to scientific and industrial preparedness for the common defense in the fields of chemical, biological, radiological and related Technology."

A major function of the new constitution is to formalize the mission of the Association as one of liaison between the chemical industry in its broadest sense and the military services generally.

One of the potentially most useful features provided for in the new Constitution is a set of committees, some technical and some non-technical, but all drawn from the chemical industry to cooperate with the applicable services. It is here that the AFCA can make very real contributions to our defense program and to the chemical industry. Through such committees and related services will our new objectives be attained.

Our major objective warrants particular attention and repetition here. It is as follows, and I quote from the AFCA Constitution:

> "The Armed Forces Chemical Association shall be a patriotic, educational, scientific, nonpolitical and nonprofitmaking organization of citizens of the United States of America dedicated to scientific and industrial preparedness for the common defense in the fields of chemical, biological, radiological and related technology."

Primarily, we are:

a) To assist in effecting preparedness for civil and military defense in the fields of chemicals;

b) To encourage chemical research and development, particularly among private, industrial, educational and research organizations in cooperation with the research agencies of the Department of Defense and to keep available the highly specialized knowledge necessary for stimulating interest in the research, development and production of chemicals adapted to modern military requirements.

I refer you to the inside cover of our last Journal for a more specific statement of the aims and goals of our Association.

Attaining each of our objectives will better help us to achieve the theme of this meeting: **Balanced Military Power through Science and Industry.** What we learn here in the next few days will determine how well prepared we will be to dedicate ourselves to these objectives. What we learn here can also keep us on the path toward making our existence meaningful as a representative and valuable catalyst to Industry, the Armed Services and related agencies.

LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

Saline Water Conversion Moves a Major Step Closer to Large-Scale Operation

Department of The Interior Selects Lummus to Evaluate Freezing Processes and Design Demonstration Plant

The Lummus Company has been selected as the architect-engineer for the East Coast saline water conversion plant which is to be erected at Wrightsville Beach, North Carolina, Secretary of the Interior Stewart L. Udall announced recently. The Wrightsville plant is the fifth in a series of five plants authorized in 1958 by Congress to demonstrate the engineering, reliability, and economic potentials of the most promising conversion processes in existence today.

The contract awarded to Lummus calls for an evaluation of the *freezing* processes of saline water conversion. (Of the other plants in the series, three will use various distillation processes and one an electrodialysis process.)

The initial activity of Lummus' contract will require preliminary engineering service to prepare estimated plant costs, layouts, and reports. A second phase will include the design of the plant to permit issuance of specifications for the construction of the demonstration plant as well as consultation with the Office of Saline Water on matters relative to awarding a construction contract for the plant.

Lummus was chosen from a group of 35 engineering firms considered for the assignment on the basis of its experience in such parallel fields of technology as refrigeration, heat transfer and crystallization. "Product" from the plant will be water of a quality suitable for municipal, industrial or other beneficial consumption. Production rate will be 250,000 gallons per day.

Over 900 plants have been designed, engineered and constructed by Lummus for the process industry throughout the world in the last fifty years. Why not discuss your next project with a Lummus representative?

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York, Newark, Houston, Washington, D. C., Montreal, London, Paris, The Hague, Madrid; Engineering Development Center: Newark, New Jersey.

Stahr Outlines Army Policy

Calls For Teamwork Of Soldiers and Scientists

I AM HAPPY to join with the members of the Armed Forces Chemical Association at your sixteenth annual meeting. The fact that the Army is the "host" Service this year affords me the additional pleasure of officially welcoming you to Washington.

In choosing the theme "Balanced Military Power Through Science and Industry" for your meeting, you are striking a chord that is certainly in tune with the times. With militant communist imperialism—which respects strength and strength alone —on the march in many areas of the world, only greater strength—measured, balanced, and ready —can give us the remotest hope to deter war, or the ability to win quickly and decisively if one should be thrust upon us.

The events of the last several weeks, and the pronouncements of President Kennedy during the last several months, I believe have begun to alert the people of this country to the deadly seriousness of the situation, and to make evident the course we must pursue to cope with it.

Our Nation is presented with three options, which are clear-cut and unambiguous.

The first option is capitulation—surrender of the Free World to the communists, piece by piece, country by country. The whole history of communism is a record of one limited aggression after another for limited objectives; of advances in the face of weakness and retreats in the fact of strength and determination; of moves carefully calculated to expand its area of control little by little without touching off a general war. If we should allow this nibbling process to continue unchecked, it could have but one result—our own ultimate destruction. It is time for every American to wake up to that elemental fact and recognize that the first option would be clearly and wholly unacceptable.

The second option is all-out nuclear war—a response to any limited communist aggression or subversion with the "big bang," which could lead to destroying all or most of what we seek to nurture and defend.

What, then, is the third option? It is to hit the threat "where it lives" by developing and maintaining the kind of power which will enable us to halt and turn back the expansion of communism without inviting chaos. This option does not imply de-emphasizing nuclear power; it does imply re-emphasizing conventional power—the measured application of force to the extent necessary to preserve order and freedom.

This "third option" is the only one consistent with our national purpose, which is the preservation of this Nation and its fundamental values and institutions, the enhancement of the welfare of our people, the insurance of a fruitful future for

Basic in over **700** chemical products

Industrial Chemicals
Agricultural Chemicals
Plastics
Metals

DOW

THE DOW CHEMICAL COMPANY
Midland, Michigan

Sales offices in principal cities

our children, and the creation of an international climate of security and stability in which all men will have equal opportunity to achieve their loftiest aspirations.

Our election of the "third option" is implicit in all of the actions taken by the present Administration to ensure our national security and support our world-wide commitments for the defense of freedom. In the words of President Kennedy,

> "We intend to have a wider choice than humiliation or all-out nuclear action."

The policy the President has so forcefully enunciated emphasizes the fact that it is imperative to keep our powerful strategic forces modern and ready in order to deter the launching of a thermonuclear attack upon us or upon our allies, and to possess the credible capability to deter so-called "limited war," or to win a decisive victory in any such war or wars in which we might become involved. Such a victory, while costly, would be cheap and eminently worthwhile in comparison to the Pyrrhic triumph of thermonuclear devastation!

Force As Required

In a stirring speech to the Nation a few weeks ago, the President urged the necessity for:

> ". . . the capability of placing in any critical area, at the appropriate time, a force which, combined with that of our allies, is large enough to make clear our determination and ability to defend our rights at all costs—and to meet all levels of aggressor pressure with whatever levels of force are required."

The President's desire in this respect accentuates the sharp break between our time-honored peace time policy of unpreparedness and a policy of "all or nothing" reliance on nuclear deterrence. From our earliest days, aggressors have been led into the erroneous assumption that our diplomacy for peace was founded upon inability and unwillingness to fight, and hence that they had no need to fear effective interference from us when they resorted to armed force. For this reason it was impossible for the United States to exert the full influence of its tremendous potential "before the fact" in helping to decide the initial issue of war or peace in the two great World Wars and in Korea. Had our resolution and capability been clearly evident, it is conceivable that none of these wars would have occurred!

Today our willingness to meet force with force is clearly evident. Our adamant determination to fight for the freedom of West Berlin, if necessary, or to rebuff aggression against the Free World anywhere else it might be attempted, has been stated in unequivocal terms. Furthermore, our fundamental ability to fight is being made plain through the strong measures now being taken to enhance our posture of immediate readiness and strength across the whole spectrum of warfare, including particularly so-called limited war.

Among the basic keynotes the President has sounded all the while has been the premise that this Nation can afford to be strong but cannot afford to be weak. In accordance with this principle, he has emphasized the need to approach the problem of budgeting by determining military needs before calculating the costs—by making the budget fit requirements instead of bending needs to conform to the budget—in short, by putting the dollar sign where it belongs. He believes—and I know you will agree heartily with him in this, as I do—that true economy lies in utilizing our resources in the most effective way to meet our real defense requirements.

The burden this places on the military user is evident. Army planners and thinkers are obligated to determine to the best of their abilities just what these real defense requirements are. Owing to the complex and dynamic nature of modern war, the President and every one of the American people he leads must turn to the military strategist, the scientist and technician and ask in utter confidence, "Just what do we need most right now to make sure that our soldiers, sailors, and airmen will have at least an even break when they collide with enemy forces?" There will be times in the months and years ahead when you can help us provide the correct answer.

Sound Management

In this connection, I want to stress the new emphasis which is being placed on economy and sound management. The President's concept of putting the dollar sign where it belongs has a corollary—the obligation to squeeze the most out of every dollar spent. The President and Congress have not handed the Armed Forces a signed blank check. They have, in effect, given us a promissory note which is negotiable only when we have determined and can show what our essential military needs are. The shift from an almost total reliance on massive retaliation to the development of forces prepared to meet the entire spectrum of war calls on us to make sure that every ounce of effectiveness is built into the organization, training and use of every single unit. The authorization to raise the Army's manpower ceiling, for example, does not in any way relieve us of the responsibility to select, train, assign, and use that manpower to the absolute best of our professional ability. The money we have at last been given for weapons, equipment, and maintenance must be spent with imagination, discrimination, and good old-fashioned cold calculation.

A good example of one of the many ways this is being accomplished in the Armed Forces can be seen in the new Defense Supply Agency. This new organization—in case you did not see the recent announcement—is one which, operating under the Secretary of Defense, will procure and distribute certain common supplies and manage related services.

In everyday language this new agency will consolidate the "wholesale" procurement and distribution of common items under one head, while allowing the Services—the "users"—to carry on their "retail" activities very much as in the past.

The study which led to the adoption of the Defense Supply Agency was launched by Secretary McNamara, and he set the course he wanted the study to take with these words:

> "I consider continued sound progress in the integration of common supply and service activities to be one of our primary means of achieving substantial improvement and economy in logistics management during the next four years."

Defense Supply

The Defense Supply Agency will bring about a fully integrated management system for common supplies and services and will result in unified policy direction and control. In addition, it will accomplish these things:

1. Lead to standardization of the organization and systems of subordinate agencies.
2. Consolidate resources, resulting in greater flexibility and simplicity in planning, programming, budgeting, and funding.
3. Make joint staffing easier.
4. Permit the separate Services to emphasize their combat support missions.
5. Reduce the competition among the Services for resources.
6. Ensure an equality of treatment among all the Services.

There is another promising road to increased economy in a field that most directly affects the representatives of American industry and Army men who work closely with them. I am thinking of the economy which results from long-range planning in the research, development, and production of the numerous and complicated instruments which our Army needs. I am thinking most particularly of the kind of far-sighted planning that helps us avoid unprofitable side roads and time-consuming excursions into unrewarding ventures.

When we take into consideration the length of time which necessarily must elapse between the inception of a new idea and its translation into a useful piece of military hardware, it becomes apparent that we must move on as fast as humanly possible toward the next succeeding objective—leapfrogging wherever we can. In this age of spiraling technology, nothing will remain static. In simple self-defense, we must jump quickly from one 'breakthrough" to another, seeking always to find new military applications for every development of science and technology before the enemy is able to do so.

The question is, how can we accomplish this? You gentlemen might ask, "Where do we come in?"

Although I cannot give you an exact answer, I can sketch in some broad outlines.

For instance, I think one of our most important objectives—one that would give us the fighting tools we need and save money at the same time—is the attainment of a proper balance between basic research, applied research, and development. We need to know as soon as possible when —idea-wise—we are headed up a blind alley and when—financially speaking—we are throwing good money after bad.

Each element of the scientist-producer-soldier team—and there are many such teams in this audience—must work together. The scientist must tell the soldier what new development he can see on the horizon so that the soldier can forecast how it will affect military weapons, equipment, and doctrine. Together they must approach the producer, who will need all the advance time he can get to plan, organize, and retool for whatever may be required.

Industrial Leaders

To industry I would say this: Industrial leaders must focus their attention not upon the factory alone, but upon the battlefield as well; not upon profit as the primary end, but the national interest as the transcendent consideration. They must have a thorough understanding of the entire range of factors which are involved in national security.

In conclusion, gentlemen, let me congratulate you for the splendid program conducted by the Armed Forces Chemical Association. In your efforts to preserve the knowledge gained from wartime experience and to encourage scientific improvement in chemical technology, I am certain that you have already considered many of the ideas I have touched upon today, and I want to assure you—whether you represent the industrial or the military side of your organization—that your ideas and suggestions are welcome any day at the Department of the Army. I commend you for the contributions you have made to the high level of understanding existing today between the Services and the chemical industry, and I am confident that your meeting this year will add new vigor to it.

ADVANCE REGISTRATION ROSTER FOR THE MEETING

Name	Company
Anderson, Wilfred R.	Army Chemical Center
Armitage, Col. David	USA Dryway Prv. Grd.
Armstrong, Don. L.	Aero-Jet General Corp.
Askin, Simon	Heydon Newport Chemical Corp.
Bachman, Paul W.	Koppers Co.
Baltazzi, Dr. Evan	Armour Research Foundation
Barnaby, Ralph S.	Franklin Institute Labs
Batson, Dr. D. M.	Ethyl Corp.
Batte, James H.	Chemical Corps Eng. Cmd.
Bear, John W.	Goodyear, Chemical Div.
Beinfest, Dr. Disney	Berkeley Chemical Corp.
Beller, Dr. H.	General Airline & Film Corp.
Bellinger, Frederick	Ga. Tech.
Bennett, Rebecca L.	OCcmlO-SILD
Bergseth, R. A.	Hqs., Chemical Corps
Bigelow, M. H.	Allied Chemical Corp.
Bingham, Chris. F.	Pittsburgh Plate Glass Co.
Black, Richard W.	Vitro Engr. Co.
Bloom, Dr. A.	General Airline & Film Corp.
Bloom, Ralph Jr.	FMC Corp.
Bluejacket, Maj. D.	U.S. Army
Bluejacket, Mrs.	
Bozzin, Michael	Ferro Corp.
Braun, Eric R.	Merch & Co., Inc.
Bregman, J. I.	Armour Research Foundation
Brinkley, Floyd	Army Chemical Corps
Brister, J. Edward	Union Carbide (Plastics)
Buldain, Frank J.	U.S. Army Chemical Corps
Bushey, Gordon L.	OCCmlO
Byrne, Capt. John P.,	OCCmlO Prog. & Eval. Ofs.
Cahill, Robert F.	FMC Inc.
Caiozzo, Anthony J.	Office Chief Chemical Ofr.
Capasso, Nicholas S.	Hqs. Chemical Corps
Carroll, John F.	Mob Det 10, NYC, P.D. (Res)
Castro, Col. C. S.	Biological Labs
Clark, W. J. Jr.	Leeds & Northrop Co.
Clifton, Knowles C.	Rocky Mt Arsenal
Cofer, Wm. T. Jr.	Mine Safety Appliances Co.
Colaianni, L. J.	Hoffman-LaRoche, Inc.
Cole, Geo. L.	U.S.A. CMLC Material Cmd.
Colleran, T. F.	Aircraft Armaments, Inc.
Cook, James B.	Barnebey-Cheney Co.
Coons, Richard D.	Geophysics Corp. of Am.
Crawford, J. C.	Com'l Solvents Corp.
Creasy, Maj. Gen. (U.S.A.) (Ret.)	Lummus Co.
Crumb, Edgar A.	Office Chief of Chem. Ofr.
Curlewis, Lt. Col. W.	Australian Embassy
Cutler, Robert R.	Arthur G. McKee & Co.
Dailey, Franklin L.	Pittsburgh Chemical Co.
DeArmon, Alex	U.S. Army & CORG
De Carlo, Michael R.	OCCMLO
Dellinger, Lawrence	Rocky Mt. Chapter
Delmore, Fred J. Brig. Gen.	U.S. Army Chemical Corps, R & D
Deroy, Glannon	U.S. Army Chemical Corps
D'Ianni, James D.	Goodyear Tire & Rubber Co.
Dick, John N., Col., U.S.A.F. (Ret.)	Allegheny Ludlum Steel Co.
Dodge, Howard M.	General Tire & Rubber Co.
Dolian, Frank E.	Com'l Solvents Corp.
Dugan, Edmund W.	Chemetron Corp.
Durram, Emmett L.,	Beckman Insts., Spinco Div.
Eddy, Richard W.	Union Carbide Corp.
Elliott, Ralph B.	E. I. DuPont
Fisher, John C.	Auco-RAD
Fisher, John H.	System Development Corp.
Flint, Delbert H.	Chemical Corps, Dept. Army
Fogelman, Edward	Diamond Alkali Co.
Fox, Robert L.	U.S. Army Chemical Corps
Friend, Wayne Z.	Int'l Nickel Co.
Frolich, Per K.	U.S.A. Chemical Corps
Gage, Wm. P.,	W. R. Grace & Co. (Research Div.)
Gamble, Samuel Jr.	Lynchburg College
Garono, Louis E.	Chemical Corps Engr. Cmd.
Garono, Louis E., Mrs.	
Garrison, Foster F.	Pittsburgh Plate Glass Co.
Gassner, Richard J.	Celanese Chemical Co.
Gassner, Richard J. Mrs.	
Gaylord, M. W.	Koppers Co., Inc.

For your chemical needs

call on Hooker

Aluminum Chloride	Phosphorus Compounds
Carbonate of Potash	Potassium Chlorate
Caustic Potash	Sodium Benzoate
Caustic Soda	Sodium Chlorate
Chlorine	Sodium Hypophosphite
Chlorobenzenes	Sodium Sulfhydrate
Chlorotoluene	Sodium Sulfide
Chloroparaffin	Sulfur Chlorides
Oxalic Acid	Sulfuryl Chloride
Muriatic Acid	Thionyl Chloride
Phosphorus	Trichlorethylene

For descriptive list of Hooker products, write for General Products List No. 100.

HOOKER CHEMICAL CORPORATION

HOOKER CHEMICALS PLASTICS

1009 Forty-Seventh Street, Niagara Falls, New York

Sales Offices: Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

Name	Company
Gaynor, Allan J.	Armour Research Foundation
Gilbert, Harry C.	U.S. Army OCCmlO
Glidden, G. M.	Acme Protection & Equip. Co.
Gordon, Nathan	U.S.A. Chemical Corps., Intell. Agency
Hall, James	The Martin Co.
Hanel, Everett	Chemical Corps, Ft. Detrick
Hanlon, Kyron W.	Mine Safety Appliances Co.
Hartmeyer, Roger W.	U.S. Army Chem. Corps
Hickey, Frederick C.,	Mine Safety Appliances Co.
Higgins, Ernest R.	U.S. Army Chemical Corps
Hirth, James Wm.	Fairchild Stratos Corp.
Hoffman, Jerre	Riegel Paper Corp.
Hoffman, Foose	
Hoffman, Ben	
Hoffman, John G., Jr.	Office Chief Chem. Ofr.
Hottel, Admiral M. P.	National Lead Co.
Housewright, Riley D.,	U.S. Army Cmlc Bio Labs
Huminik, John, Jr.	Value Engineering
Hutchings, R/Admiral C. H.	Republic Aviation Corp.
Iredell, Robert	General Tire & Rubber Co.
Jaffe, Louis	Federal Aviation Agency
Jackson, Wendell F.	E. I. duPont
Jarchow, H. L.	North American Aviation, Inc.
Jarchow, H. L., Mrs.	
Jonas, Theodore A.	American Potash & Chemical Corp.
Jonas, Glenn	American Sterilizer Co.
Jones, Allen F.	E. I. duPont
Keefe, John M.	FMC Inc.
Kenis, Ivan	Olin Mathieson Chem. Co.
Kiernan, Charles A.	Federal Labs., Inc.
Kirsch, John	U.S. Army, Ft. Detrick
Kirsch, John C., Capt.,	U.S. Army CmlC Bio Labs
Koslov, Josep	Vitro Engineering Co.
Koster, Wesley R.	U.S. Dept. of Commerce
Lane, Leslie C.	American Cyanamid
Lawrence, Wm. W.	Blaw-Knox Co.
Lee, Wm. M.	Pennsalt Chemical Corp.
Loucks, Charles E.	National Paint, Varnish & Lacquer Ass'n.
Lowe, Edwin P.	Ft. Detrick
Luke, Oren V.	Spencer Chemical Co.
Lundsted, Lester C.	Wyandotte Chemical Corp.
Lutz, Garson A.	Battelle Memorial Institute
MacArthur, Donald	Koppers Co.
MacArthur, John C., Colonel	U.S.A. (ret.)
McAuliffe, A. C.	American Cyanamid Co.
McClure, Harry	Union Carbide Corp.

Continued on page 35

RAW MATERIALS FROM AROUND THE WORLD TO CHEMICAL PRODUCTS FOR A BETTER WORLD

For over 65 years The Harshaw Chemical Company has been gathering raw materials from North and South America, Europe, Asia, Africa, and Australia, all the continents of the world.

Until a few years ago, international operations of The Harshaw Chemical Company were confined to the procurement of raw materials and the sale of finished products. Now even the manufacturing and research operations of Harshaw are international. The formation of Harshaw van der Hoorn N.V. of Utrecht, Netherlands is another expansion in international operations. Harshaw's electroplating chemicals, ceramic colors, and catalysts are now being produced in England, France, and Holland, and Harshaw's service is available to customers in the Common Market.

HARSHAW

THE HARSHAW CHEMICAL COMPANY

1945 EAST 97th STREET • CLEVELAND 6, OHIO

Product Manufacturing Divisions:

FLUORIDE • OPTICAL CRYSTAL • ELECTROPLATING
PIGMENT • DIES AND FINE CHEMICALS • CATALYST
METALLIC SOAPS • CERAMIC COLORS

Creating Balanced Military Power

by General Clyde D. Eddleman
Vice Chief of Staff

The leaders and the members of the Armed Forces Chemical Association can take justifiable pride in the contributions your organization has made over the year's in improving the combat capability of our nation's armed forces. Advances in technology, largely the product of your imagination and ability, have been accelerated by the free and rapid exchange of information made possible through your Association.

Advanced technology not only has contributed to the effectiveness of our military forces but, in so doing, it has added a multitude of complex problems in equipment, organization, training and tactics. As a result, the armed forces have become progressively more and more dependent on American industry for aid in solving our many diverse problems. Such interdependence demands an effective industrial-military effort which can be achieved only by mutual cooperation and understanding. Your Association has made a significant contribution in this field of which the Army is proud to be included.

Our mutual recognition of the need for balanced national military power is adequately emphasized by the theme of your conference; therefore, I shall touch only briefly on that important point. I will, however, cover some of the practical problems now confronting us in creating that balanced power —particularly as the Army is involved—and I will outline some of the methods for their proper solution.

The unstable world in which we live contributes inordinately to the multiplicity of national security problems which now face us. It is a world with an accelerated population growth; with millions of underprivileged people hungering for a better way of life; with nationalism rampant in numerous new nations; and with an exploding technological revolution which has already projected four men into outer space. Small wonder it is that the "status quo" will be denied to us for many years ahead.

The Berlin crisis is but one part of a broader challenge we face today in this dynamic and unstable world. For the past 15 years the menacing attitude and actions of communist leaders, who are obsessed with their own ideology, have been a source of world tensions. The powerful armed forces maintained by the communists throughout this period have provided their leaders with an enormous political flexibility of which they have taken full advantage. Based on past performances and the current pattern of events, we are forced to conclude that their ambition for world conquest remains unabated and that the free nations of the world will continue to be confronted with threats ranging from nuclear annihilation to economic demoralization.

Thus we find ourselves faced with threats which are economic and political as well as military; threats which transcend the purely military task. In short, we must maintain, in addition to our already enormous military effort, our productivity on the farm, in the laboratory and in the factory. We must have a balanced defense against this threat in all of its forms; a defense backed by a strong national will and a renewed dedication to defend our cherished freedom. We must be able to defeat any challenge with the full mental, moral and physical resources that the free world is able to muster; and to do so under United States leadership.

Recently, I heard a prayer which expresses our needs today very clearly. In part, it said: "Grant us strength, fearlessly to contend against evil, and to make **no peace** with oppression; and that we may reverently **use** our freedom, help us to employ it in the maitnenance of justice among men and nations." Unquestionably we need that kind of

strength now. We can develop it by renewing our faith in America and by devoting to her service the means necessary to retain our national strength.

With a full realization of the multiple crises facing us world-wide, the Congress, upon the recommendation of the President, has recently made provisions for the rapid improvement in the balance and flexibility of our military forces. These measures will enable us to oppose more effectively the threats of aggression in all of its forms and wherever it may occur. Also, they will enable us to create a better balance between our conventional and our nuclear capabilities, thus providing our national leadership with much greater political flexibility in the international arena.

Increased Army

Under the aforementioned measures the authorized strength of the Army will increase from its present 875,000 to a total of 1,008,000 by the end of this fiscal year. This action recognizes the importance attached to the role of Army forces in meeting the numerous and varied military threats arising around the world today. There is no surer deterrence to aggression, in any particular locality than to have first-class, combat-ready military forces in being on the ground. Where we lack such forces, we must be able to reinforce promptly our allies, located in the area, with the necessary strength to defeat actual aggression or deter threatened incursions.

Today, confronted with a potential military threat along much of the Communist periphery, we must either have military forces "there" or be able to deploy them there **in time** with **enough** force to insure preservation of our vital interests and those of our allies.

We in the Army have taken cognizance of the problems facing us in meeting these threats in various areas of the world—areas ranging from the highly industrialized complex of Western Europe, through the jungles and forests of Southeast Asia, across the arid, but oil-rich, wastes of the Middle East, to the strategic northern approaches of the frozen Arctic.

These problems—inherent in the wide variety of operational circumstances in which we must be prepared to fight—have caused us to create a flexibility which has never existed before in the Army in the degree now required. Quite obviously we would not use the same types of equipment in all areas of the world. We would not require the same amount or the same types of transport, nor would we use the identical battle formations. We have adopted recently a new division organization which we are confident will meet our requirements for far greater versatility.

Our principal objective is to produce a capability flexible enough to respond to the variety of situations which may occur anywhere in today's turbulent world. While primarily organized for either nuclear or non-nuclear conflict, our new divisions are particularly adaptable to meet the limited war threat. Non-nuclear firepower is increased; tactical mobility (both ground and air) is improved and is tailored to the operational enviornment—and a new building-block concept is incorporated in which the types of combat maneuver elements are readily interchangeable. We are creating fully mechanized divisions—for the first time in the Army's history.

Using the building-block concept of organization, variable numbers of infantry, tank, and mechanized combat maneuver battalions will be added to a fixed division command and support base, to form armored, mechanized or infantry divisions tailored for particular missions. Airborne divisions will have a similar capability for rapid and variable tailoring.

Appliction of this concept will permit increased armored and mechanized strength in the divisions in Europe. For the divisions in the Pacific and other overseas areas, and those held in strategic reserve in CONUS, composition will differ markedly. These units will be tailored to their missions and the operational environment in probable areas of employment.

The building-block structure will be extended to the units of the Army National Guard and Army Reserve. This concept, coupled with new training and equipment programs, will facilitate much more rapid call-up of our high-priority units.

Reserves Ready

I cannot overemphasize how significant it is to us that the readiness of our reserve units today is so improved. Late last month, as you know, the President announced that Army units composed of some 46,000 reservists would be called into active service this year. I am confident that these units, with only 30 day's notice, will move right in and pick up their missions in our expanded Army without any loss of time or effectiveness. We have reserve readiness plans that will reduce even further the time required for call-up and deployment to our ready reserve units. The attainment of these reorganization and readiness objectives will make a significant contribution to our combat capability for both general and limited war.

In addition to improving our division organization, the Army has increased emphasis on Special Forces, those highly skilled specialists who are trained for para-military operations and unconventional warfare. We are not only doubling the num-

Continued on page 36

The Ladies

By MAJOR REBECCA BENNETT

The ladies who accompanied their husbands to the 16th annual meeting of the Armed Forces Chemical Association this year were given the V.I.P. (Very Important Person) treatment for two very full and interesting days. Mrs. Marshall Stubbs, Honorary Chairman of the Ladies' Program had arranged a combination of tours to places of interest in Washington, social engagements, and a most informative and enjoyable day spent at Army Chemical Center, Maryland.

An early morning, specially conducted tour of the White House opened the first day in high style. The ladies actually saw some of the furniture and paintings that had been placed in the official reception rooms of the White House before Mrs. Kennedy had seen them in their own surroundings as she was out of town while the work was being done. The redecoration and recent improvements were noted with admiration.

One could spend weeks in the National Gallery of Art and still not truly see everything. A specially guided tour had been arranged so that the group was led from gallery to gallery and particular paintings were pointed out and discussed by a member of the staff.

On to Capitol Hill and a seat in the Senate Gallery. Fortunately for the group, a lady was presiding at the time, Senator Maurine Neuberger, Senator from Oregon. Debate on the floor was most active and many of the senators from the home states of the ladies were recognized.

Not everyone can claim the distinction of having luncheon in the Old Supreme Court Room where President Kennedy held his innaugural luncheon, but lunch there they did. As an apertif, Senator Hubert Humphrey came by and welcomed the group and spoke briefly. Several of the group stayed on in the afternoon and had the honor of meeting and talking with Vice President Lyndon B. Johnson.

Thursday evening in the Presidential Room at the Statler, a reception was held. It has been said that it was one of the most sociable and friendly affairs ever held. At the close, many small groups drifted off to dinner parties in various well known restaurants and dining rooms in the city.

Friday morning an air-conditioned bus awaited to take the group to Army Chemical Center, Maryland for the day. The trip was made pleasant by setting up two tables of bridge to while away the time.

For many, this was their first trip to an Army installation. From the moment they were met at the gate by the M.P.'s, through a band concert, picture taking, greetings and briefings by Colonel Donald Yanka, Commanding Officer, Chemical Research and Development Laboratories, and his staff; and a tour of some of the facilities in the labs and on the Post, the day was a most memorable one.

Hostesses for the day were: Mrs. Donald Yanka, Mrs. Lloyd E. Fellenz, Mrs. William E. R. Sullivan, Mrs. Gilbert Gibbons, Mrs. Howard Aylesworth, Mrs. Allan Hamilton and Mrs. James McHugh.

Of particular interest during the briefing were informative talks by Miss Anne Kunkel and Mrs. Margaret Filbert, scientists from the laboratories. They told of the important role that women scientists were playing in our defense mission and outlined many of the contributions made by women working in the laboratories of the Chemical Corps.

Historic Gunpowder Officers Mess, which is beautifully located on the river of that name, lived up to its excellent tradition of hospitality. In a private, beautifully decorated dining room, a seafood supreme luncheon was served. Mrs. Richard J. Phillips played organ music throughout the time.

Major Stephen G. Crowell escorted the bus on a short tour of the Post, after pointing out places of interest and the group headed back for Washington.

The banquet that evening in the Presidential Room of the Statler was a fitting climax to two busy days. The guests of honor were led to their places by the Old Guard Fife and Drum Corps of the Third Infantry followed by the presentation of the colors. The United States Army Chorus were splendid and received a special ovation when the new Army Chemical Corps song was sung.

General C. D. Eddleman, Vice Chief of Staff, United States Army, paid tribute to the Armed Forces Chemical Association in his splendid address.

During these two days, many old friendships were renewed and many new acquaintances made among the wives of the Association members. It is hoped that next year there will be many more wives joining their husbands when the 17th annual meeting convenes again in the Nation's Capitol.

1961 MEETING

Secretary of the Army Stah
Major General Marshall Stu
Simon Askin.

EXECUTIVE COMMITTEE

THE WHITE HOUSE
WASHINGTON

Dear Mr. Askin:

It is a sincere pleasure to send greetings to all attending the Sixteenth Annual Meeting of the Armed Forces Chemical Association.

The theme of the meeting this year - Balanced Military Power Through Science and Industry - is especially appropriate now when all Americans are resolved to demonstrate to the world the kind of achievements possible through our spiritual strength, our scientific and technological genius, and our economic productivity. It is indeed comforting to realize that the nation can rely on the fund of knowledge and experience represented by your membership.

My best wishes for a successful and profitable meeting.

Sincerely,

Mr. Simon Askin
President
Armed Forces Chemical Association

THE SECRETARY OF DEFENSE
WASHINGTON

Dear Mr. Askin:

Please extend my greetings to the members and guests of the Armed Forces Chemical Association on the occasion of its Sixteenth Annual Meeting.

The members of the Armed Forces Chemical Association can be proud of the significant contributions they have made in actively promoting the cooperative efforts of industry, civilian organizations and the Armed Forces in applying science to the problems confronting the military.

Please convey to all attending my best wishes for a highly rewarding and successful meeting.

Sincerely,

Robert S. McNamara

Mr. Simon Askin
President
Armed Forces Chemical Association

Wendell F. Jackson, Simon Askin, Ovid E. Roberts.

Robert T. Norman, Adm. M. P. Hottel, Col. Delinger.

Carroll W. Hayes, William J. Taylor, Frederick Bellinger.

Harry A. Wansker
Maj. Gen. Marshall Stubbs
Carroll W. Hayes
William J. Taylor

Dr. Frederick Bellinger
Donald MacArthur
Dr. Wendell Jackson
(on the right side of the table)
Harry A. Wansker, W. T. Cofer
Dallas Halverstadt
Simon Askin
Edgar Newhouse III
Maj. Gen. C. E. Loucks
(to his left) Col. Victor Searle
Dr. Donald Keyes and camera.

Victor C. Searle
G. M. Glidden

Dallas Halverstadt.

Donald Keyes & camera.
Robert J. Milano.

REGISTRATION

Secretary of the Army Elvis Stahr and Simon Askin.

Generals A. C. McAuliffe and William Creasy.

Simon Askin.
Major General Marshall Stubbs
Major General William M. Creasy, Ret.
Brig. General L. E. Fellenz.

LEADERS

The Ladies

Mrs. Simon Askin

Mrs. Marshall Stubbs

The ladies pause for a picture at the Army Chemical Center. Mrs. R. K. Anderson, Mrs. Simon Askin, Mrs. Donald Bluejacket, Major R. L. Bennett, Mrs. Robert Cutler, Mrs. H. M. Dodge, Mrs. R. J. Gassner, Mrs. Foster Garrison, Mrs. M. W. Gaylord, Mrs. W. F. Jackson, Mrs. C. E. Loucks, Mrs. Garson A. Lutz, Mrs. D. E. Most, Mrs. E. V. Needles, Mrs. Philip Nolan, Mrs. Marshall Stubbs, Mrs. W. A. Warnes.

Officers wives who acted as hostesses for the ladies of Armed Forces Chemical Association during their visit to the Army Chemical Center. Top to Bottom: Mrs. Gilbert P. Gibbons, Mrs. Howard C. Aylesworth, Mrs. Allan C. Hamilton, Mrs. James E. McHugh, Mrs. Lloyd E. Fellenz, Mrs. William E. R. Sullivan, and Mrs. Donald E. Yanks.

Awards

General Loucks awards a plaque to Simon Askin for increasing the AFCA membership.

General Loucks awards Dr. Wendell Jackson a plaque for distinguished service as a president of the AFCA.

General Loucks awards a plaque to Lt. Col. Ovid E. Roberts for increasing the AFCA membership.

General Stubbs presents the Safety Award to the Army Chemical Center for the best safety record among Chemical Corps installations over the past three years. Col. McHugh receives the plaque.

General Loucks awards a plaque for distinguished service to AFCA to Robert J. Milano.

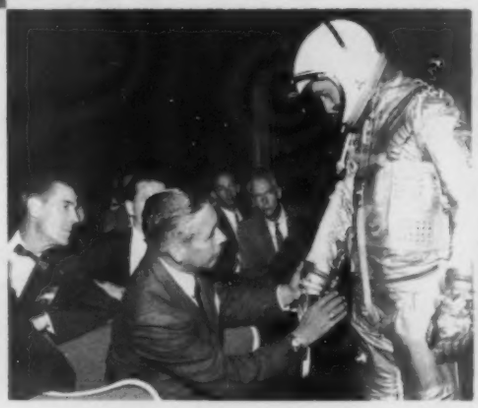
General Stubbs presents the soldiers of the year award to PFC G. W. Warner of the Rocky Mountain Arsenal.

General Loucks awards a distinguished service plaque to Major Bernard S. Elfert, Army Chemical Center.

Samuel Gamble Jr., General Delmore, General Fellenz, Dr. Weiss, B. H. McDermott, B. H. Shoemaker, Lt. Col. Curlewis, Australian Army, Col. A. W. Meetz.

Air Force Briefing Team with Lt. Col. McWhirter: Lt. Col. R. J. Mason, Major Harold E. Wells, Lt. Col. D. A. McWhirter, Colonel Arthur E. Boudreau.

Applause for speaker.



Members examine a Navy space suit.

Major General John M. McNeill, C.B.E., British Army Staff,

Major General Marshall Stubbs, Chief Chemical Officer.

Pfc Warner and Maj. Gen. Marshall Stubbs.

Chapter officials after lunch as guests of Vice President Milano. Calvin L. Palmer, Vulcan-Cincinnati Inc.; Richar W Heyden-Newport Chemical Corporation, Lt. Col. L. M. Delinger, Rocky Mountain Chapter, Michael Bozsin, Ferro Co Milano, Millmaster Chemical Corporation.

J. William Hiser, Dr. Seymour Silver, Robert O. Bergseth, Col. John G. Hoffman, Marvin Marcus.

Bill Clark, R. S. Rhodes, Marvin Marcus, Robert R. Cutler, George T. Wingate, L. C. Turnock, John W. Bean, J. D. D'Ianni.

Marvin Marcus and Dr. Francis Weiss.

Tina Lower posts a notice on the meeting call board.

W. Eddy, Union Carbide; Chenery Salmon, New England Chapter; C. A. Bunnell, Wilmington Chapter; Simon Askin, Ferro Corporation; J. Wm. Rice Jr., and George L. Cole, Chesapeake Chapter; Capt. J. C. Kirsch, Fort Detrick; Robert J.

Edward Fogelman, Captain R. K. Anderson, USN, Alan G. Richards, I. A. De Armon, G. L. Cole, H. M. Dodge,

CLOSE-UP

Dr. Frederick Bellinger Chenery Salmon, Brig. Gen. T. H. Marshall (Ret.)

Dr. C. P. Vincent, David Kelsey, Stan Mattison.

Dr. Per K. Frolich, Lewis Terry, Brig. Gen. Fred S. Delmore.

Ralph Elliot, William Williams Reynolds, Dr. Wendell Jackson, C. G. Patterson, R. B. Reynolds.

Simon Askin, Robert J. Milano, Richard Eddy, General A. C. McAuliffe.

Ralph S. Barnaby, Dr. Wendell Jackson.

G. M. Glidden, Gradon L. Willard, Lewis Terry.

R. L. Zouck, General Delmore, T. F. Colleran, J. William Rice.

G. L. Willard, Paul J. Walsh.

Delbert H. Flint, Jr., Dr. Wendell Jackson.

T. A. Jonas, Robert Cahill, Marlin L. Sims, Ralph Bloom, and Leonard T. Pool.

Mrs. Simon Askin, Mrs. Foster Garrison, Mrs. Wendell Jackson, Major Rebecca Bennett.

Afternoon Affair

in the Presidential Room

Mrs. C. E. Loucks
Mrs. John Moran.

Miss Doris Cooper, Aero-Jet, General Fellenz, Miss Elaine Ahalt, CmclC, General Stubbs, Miss Caroline Swope, CmclC, General Donald D. Salmon, USMC, Ret.

The Banquet

Banquet Table

Dr. David E. Price, Deputy Director NIH
Mrs. Thomas Hughes

Rear Admiral K. S. Masterson, USN
Mrs. Fred A. Delmore

Major General Stubbs, Chief Chemical Officer, USA
Mrs. Tobey

Mr. Bernard Boutin, Deputy Director, GSA
Mrs. Paul A. Gavan

Honorable Ivan A. Nestingen, Under Secretary, HEW
Mrs. Edward A. McDermott

Congressman Robert L. F. Sikes, (D. Fla.)
Mr. Simon Askin, President, AFCA

Lectern

Lieutenant General Clyde D. Eddleman, Vice Chief of Staff, USA
Mrs. Robert L. F. Sikes

Mrs. Simon Askin
Honorable Edward A. McDermott, Deputy Director, OCDM

Mrs. Ivan A. Nestingen
Major General Paul A. Gavan, Commanding General, MDM

Mrs. Edward Boutin
Major General Frank A. Tobey, Chief of Chaplains, USA

Mrs. Marshall Stubbs
Brigadier General Fred A. Delmore, USA

Mrs. K. S. Masterson
Honorable Thomas Hughes, Assistant to the Secretary of Agriculture

Mrs. Oran Beatty
Mr. Carrol W. Haynes, Meeting Chairman

Mrs. Donald MacArthur
Dr. Wendell F. Jackson, Immediate Past President, AFCA

Mrs. Simon Askin, Edward A. McDermott, Mrs. Ivan A. Nestingen, Major General Paul A. Gavan, Mrs. Bernard Boutin, Major General Frank A. Tobey.

Mrs. Marshall Stubbs, General Delmore, Mrs. K. S. Masterson, Mr. Thomas Hughes, Mrs. Oran Beatty.

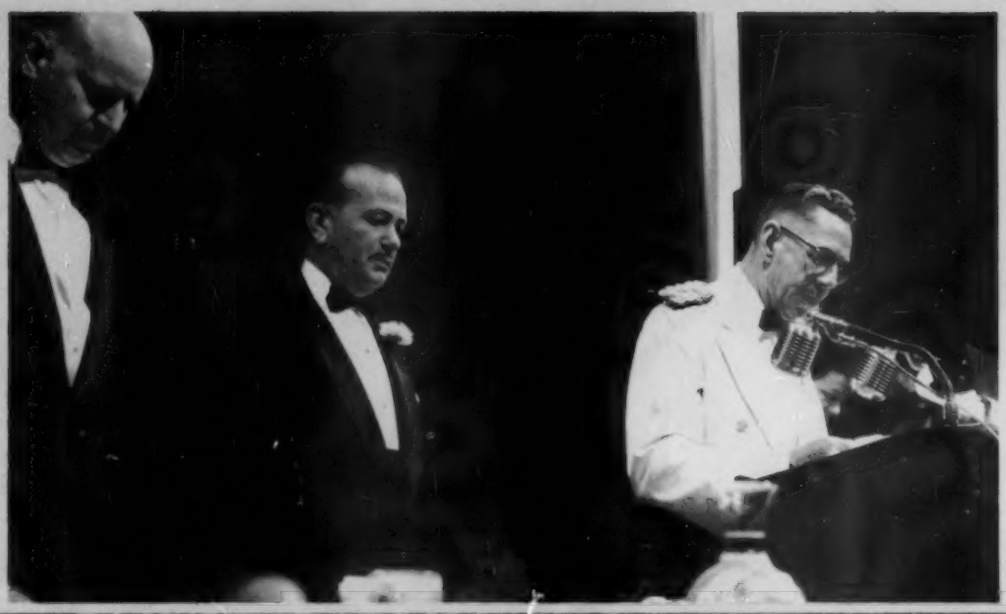
Mrs. Paul A. Gavan

Mrs. Thomas Hughes
Admiral K. S. Masterson
Mrs. Fred Delmore.

Mrs. Simon Askin, Simon Askin, Carroll Hayes.

Mrs. Donald MacArthur, Dr. Wendell F. Jackson

Mr. Donald MacArthur, General Stubbs.



The Blessing at the banquet.
General Robert L. F. Sikes,
Simon Askin,
Major General Frank A. Tobey.

Balanced Arsenal Balanced Power

by Major General Marshall Stubbs
Chief Chemical Officer

WORLD EVENTS during the past several months have increased the significance of the objectives of your organization. Forums in which industrial and military objectives can be discussed and given concrete direction are of the utmost importance.

In the past, including a number of times before this association, I have discussed chemical and biological weapons in somewhat general terms. I have outlined the nature of these agents, and their effects, and some of the problems of detecting their presence and protecting ourselves against them.

It is time now to discuss the various strategic and tactical situations in which chemical and biological weapons could be used by an aggressor. Present world events make such discussion imperative. There needs to be as much recognition of the military aspects of chemical and biological weapons as of their scientific aspects.

We can begin with an examination of the new balance of deterrent forces which has been born and reared so rapidly in the past year. This change has been brought about by the recognition that there is something concrete and highly probable between the two extremes of the major problems facing the free world today. Nuclear holocaust on one hand and slow and gradual encroachment on the other could mean the end of our dearly purchased heritage. Neither of these is acceptable and we must face the realities of the choices we may have to make to preserve the kind of world we want to live in.

It is the area between these two extremes in which President Kennedy has asked for a wider choice of response. Essentially he has asked for the delicately balanced power which can only be provided by a balanced arsenal of weapons. In order to avoid the trap of having to make an unwanted choice we shall have to be able to use whatever power is necessary to defend ourselves.

The two exteme choices, nuclear conflict and gradual encroachment, and the gradation of active and passive response between them has often been called the spectrum of conflict.

One of the most important characteristics of chemical and biological weapons is that they have a wide range of effects which can be selectively applied by an aggressor in almost any military situation. If we recognize the fact that conflict has a spectrum, that it is not a matter of holocaust or surrender, then it would be foolish to assume that the infinite military variety offered by chemical and biological weapons has not been carefully scrutinized by a potential aggressor. It is safest to assume that chemical and biological weapons have been accepted as members of his family of weapons.

Based on this assumption, we must be ready to meet two urgent requirements. The first requirement is a capability to survive and maintain a high level of combat proficiency in a toxic environment. Second we must provide our own forces with the same form of measured response.

That we posses this form of response is extremely important. First, because it gives us a possible deterrent for that level of conflict. Second, it gives us the ability to engage in that level of conflict on an equal footing. It gives us the means to avoid stronger measures which could escalate the form of conflict.

In short, CBR is synonymous with the flexibility required by a concept of measured and restrained response, and we can be sure that this is well recognized by aggressor nations. I will review briefly some of the characteristics and effects which provide this flexibility. I will then relate these weapons to some of the many possible forms of conflict.

The flexible characteristics are these:

1. Chemical and biological weapons can be

selected which will either be restricted to pinpoint targets without spill-over effects or which will cover increasingly larger areas until they are measured in tens of thousands of square miles.

2. Their effects range from temporary incapacitation to lethal in a large percentage of the target population. There are numerous graduated degrees of effect between these two extremes.

3. They are search weapons and are effective against personnel in hard targets or shelters, but their effect is not diminished on personnel in the open.

4. Effects can take place in seconds or in a wide variation of delayed onset periods.

5. They can be delivered by most means associatead with other weapons and by some distinctive carriers. Chemical and biological agents can be delivered by many means ranging from intercontinental ballistic missiles to, in the case of some biological agents, tiny insect vectors.

What I intend to do is to pose some hypothetical situations which will envisage most of the possible forms future conflict could take. We have experienced many of these forms in the past. We can assume that we may face them again with differences only in the technology involved. I should like, with a mixture of past experience and imagination, and with the help of a short series of slides, to speculate on some of the effects of the use of chemical and biological weapons along the spectrum of conflict.

Flexible Conflict

The degrees of conflict are themselves flexible. In reality any degree could contain elements of any other. The first degree involves long range insidious aggression characterized by extreme patience and constant purpose on the part of the aggressor.

The second situation also involves insidious approaches but with elements of purposeful physical action. This is the case when friendly or wavering elements in a country are continuously subjected to intimidation by planned rioting.

The third situation involves local uprisings in which the aggressor has infiltrated political minorities. A quasi-military capability has been established and moves from underground against an otherwise peaceful populace.

The fourth-degree of aggression involves more formal military operations and guerilla tactics. This aggression is supported by external forces and materiel in the form of non-identified volunteer support.

For the fifth form of conflict we can draw from our recent experience in Korea to produce a situation involving a limited area war without nuclear weapons.

Sixth, World War II provides us with the most recent example of a major area conflict.

We will have to use war game experience and imagination for the seventh degree of conflict. This type of conflict would involve the use of tactical nuclear weapons.

Finally, there is the form of conflict which no one wants but which cannot be avoided by ignoring it. This is the all-out nuclear conflict in which most of the world would be involved. At this end of the spectrum we would have to assume that our deterrence had failed. It can fail most easily if an enemy thinks that he can win this way in the long run. One way in which he might make this assumption would be the added insurance of being able to complement his nuclear strikes with chemical and biological weapons. His judgment could be influenced if we were not in a position to retaliate in kind.

Could Make the Difference

If it came to the question of who would survive an all-out nuclear conflict, chemical and biological weapons could make the difference if they were used in conjunction with nuclear weapons.

The national forces, especially in a democratic country, may be operating under a severe restriction because of their concern for the safety of the populace. The possibility of the development of chemical agents which temporarily incapacitate, offer these forces a weapon which could be used without fear of injuring their own people. In this case a riot control agent would not necessarily have the desired military effect. This would be the case if national forces wanted to prevent the escape of the insurgents. Although the riot control agent might seriously incapacitate them, they would recover soon after they retreated into fresh air. A longer lasting effect would be required to capture armed insurgents.

An agent could be used which would immobilize the infiltrating force either by causing physical paralysis or by producing mental effects which would make it impossible for the enemy to carry out military assignments. The enemy personnel could then be interned and the affected population would recover. If this kind of agent were used instead of concentrated conventional fires the usual charges of "Brutal Suppression" could be held to a minimum.

In cases of local aggression in which the major world powers are not directly involved, chemical and biological weapons in the hands of the aggressor could spell disaster. In this case the flexibility of delivery would be of extreme importance. No expensive delivery systems are required for chemical and biological operations in limited terrain.

A spray tank carried on a guerrilla's back could provide a point source of a chemical agent which could cover a significant area.

On the biological side it has been recently reported in the press that a crude form has already been used by Viet Cong rebels. They have used spear traps and hidden spikes tipped with manure, or with a prepared culture. This technique produces casualties by causing infection instead of only an annoying injury. The results have probably been minor, but it is a beginning.

Jungle climates are especially suitable for the use of persistent chemical agents. A small guerrilla band could penetrate deep, cause extensive damage and using a chemical agent such as mustard, cover their route of exit and protect their flanks. This would involve a minor logistical effort on their part. High humidity and dense foilage increase the persistency and aggravate the effects of mustard. Although few deaths would occur among pursuing forces, severe incapacitation could be expected. Vehicle mounted spray tanks and mustard filled mines could accomplish this objective. This use of mustard could allow a small, lightly equipped invader to defeat an established, well-equipped force.

The Korean conflict is an example of what might have been the result on tactics if chemical and biological agents had been used there. In this conflict we were faced with conditions which could have been affected greatly by the use of chemical and biological weapons. In Korea, huge troop concentrations were characteristic.

False Charges

Under these conditions, and with even basic knowledge of the effects of chemical or biological agents against massed troops, the trumped up charges that they were used in Korea become pure fabrication. This is so even when a conservative estimate of their possible effects is made. There would certainly have been no need for the ridiculous types of so-called evidence used to support that false charge.

If they had been used, there would have been no lack of evidence. Under the conditions of climate and sanitation there, and with no more effort than was used to deliver anti-personnel high explosives and flame, we could have expected a significant percentage of casualties from biological infection in rear areas.

If chemical agents had been used against mass attacking troops in that conflict, there would have been no need to fabricate the evidence of its use either. Improvised flame minefields were used with success to break up mass attacks. Their effect, however, was limited to the initial waves. Subsequent waves could continue the attack. If a nerve agent had been used instead of flame, all waves of attackers would have been endangered. It is doubtful that any mass attack by troops on foot could have been successful if our positions had been defended by chemical mine fields.

World War II is an example of the next degree of conflict. It was a major area war, but was fought without tactical nuclear weapons. Both sides in that conflict were capable of conducting extensive chemical operations.

Hard Targets

In Europe, for instance, this war was characterized by many hard targets, military fortifications and temporary but effective shelters. Armor was prevalent. Our protective devices were at a minimum, especially when the fact is known that the Germans had a nerve agent available. The tide of conflict could have been seriously affected if these agents had been used. It does not seem reasonable that the decision against the use of the nerve agents was the result of a lack of faith in their ability to produce a tactical advantage. Perhaps they were not used because the Germans were convinced that our ability to retaliate was overwhelming.

At one point in the landings, the troop concentration on the beach was extremely heavy. We had gained a foothold and were pouring men and equipment onto the beach to keep our advantage. We had not yet broken out of the defending ring. Conditions seem to indicate that we were extremely vulnerable to a nerve agent attack. A beachhead by definition is a low area. The humidity is naturally high in that area of France, and winds were low enough for parachute landings.

Suppose that in conjunction with the nerve agent attack, several floating generators containing a biological agent were released by submarines while the landing was being made. The invisible aerosol would have drifted over landing craft and settled on clothing, food packages, water tanks or any other objects, with which our troops would come in contact.

Next, consider the medical problems which were actually faced with at Normandy. There were problems of care for the wounded and evacuation which stretched the super-human abilities of our medical personnel to the limit. It does not take too much imagination to realize what a combination of nerve agent and a biological agent at Normandy could have done to our forces.

How much longer would that conflict have lasted had we failed at Normandy? What would our position in Europe be today, if we had not been able to carry out our European offensive from the Normandy starting point? Even these general

speculations cannot fail to emphasize the importance of chemical and biological agents on military operations.

We do not have any actual experience in a war in which tactical nuclear weapons have been employed. This form of conflict would have certain general aspects about which there can be little doubt, however. There would be wide dispersion of combat elements. The forces would be highly mobile. Isolation of forces would be common.

Chemicals Attractive

When these aspects are considered in light of some of the characteristics of chemical and biological agents, you can see why they would be very attractive to an enemy commander faced with these conditions. The area coverage and search characteristics of these weapons could be used to overcome the problem of the poorly defined targets offered by widely dispersed units. Biological agents could be used when large areas were involved. The more rapidly acting chemical agents could be used when smaller tactical areas were involved.

The fact that persistent agents could produce an unattended barrier would afford the commander of an isolated unit a defense for much of his otherwise unprotected perimeter.

One example of possible tactical application is shown in very general terms on this slide.

A commander, faced with a possibly overwhelming attack against his positions could call for a biological strike, while the opposing force is in the build-up stage or when he has started to move. The effects of this agent would be delayed, however, and he would have to do something else to slow down the attack. For this he could use nuclear strikes. Chemical agents could be used to fill in the gaps between the widely dispersed attacking elements. If he still had to withdraw, he could cover his movement with a combination of nuclear and persistent chemical agents.

The logistical support problems for a conflict of this type are already considered to be a major problem. This problem could be extremely aggravated by the use of chemical or biological agents on supply centers and against service personnel. The use of these agents could be timed exactly to make them effective when a general offensive was to take place. Additional logistical problems arising from the required protective measures in the event of use of chemical and biological agents must also be given a great deal of thought. Protection of food supplies is just one example of the kind of thing which must be considered.

We have now reached the other end of the spectrum of conflict. This degree of conflict is anomalous because all of our other efforts, at every other level of conflict have been made to prevent it. You may want to ask therefore, why we should consider it at all. We must consider and examine this form of conflict as carefully as any other form for the same reason we looked at the others. Our hope is, that by being fully prepared to engage in this conflict we shall be able to deter an aggressor from starting it. This includes not only the ability to strike the aggressor as hard or harder than he can strike us, it also includes the ability to minimize the casualties resulting from his strikes. He may be deterred by the knowledge that the casualties he can produce are not worth the risk he would take.

Chemical and biological agents exist which can be used strategically to cause casualties in an area the width of a continent. Shelters which would protect the population from nuclear blast will not necessarily protect it from chemical or biological attack. If we do not think about these defensive aspects, we are taking the risk of having obvious weakness in our defenses. These weaknesses could make an enemy believe that enough additional casualties could be produced in this way to make an attack worth the risk. A nuclear attack alone would cause grave problems in sanitation and medical care. How much more grave would these problems be if biological agents were intentionally used? Especially if the agents were exotic types with which surviving medical personnel had little experience. Some thought and concrete planning can go a long way to insure that casualties are held to a minimum.

Army Eventuality

I think the most important aspect of this review of the spectrum of conflict has been the obvious lesson that all of our degrees of strength depend on our strength at every other degree. They cannot be separated. It has emphasized what we have often said in the past, that we must be prepared for any military eventually. We must have a balanced capability in every reasonable weapons system.

I think that we can have great hope for the future of our country and the free world. We have developed a workable knowledge of the kinds of pressures we face. We have a good understanding of the real meaning of balanced power. We must have the initiative of choice. The better balance in our arsenal provides this initiative by removing the restriction of response in one extreme or another. Balanced power through a balanced arsenal is no longer only a good idea. It is a description of the firm purpose of the free world to keep freedom alive.

REGISTRATION **Continued from page 11**

Name	Company
McDermott, Bernard	Ferro Corp.
McEvoy, John P.	U.S. Army Chemical Corps
McLain, Joseph H.	Olin Mathieson
McLeod, Robert D.	Aero-Jet General Corp.
McNary, Charles H.	Office Chief Chemical Officer
Maier, H. M.	Nat'l Lead Co.
Malinowski, John C.	U.S.A. Biological Labs
Marquand, Dr. C. B.,	U.S. Army Chemical Corps
Marshall, Brig. Gen. T. H.	(Ret.)
Matejczyk, John	O. Hommel Co.
Mattison, Stanley	Hooker Chemical Corp.
Mattson, Ray	American Cyanamid Corp.
Maupin, C. J.	Pine Bluff Arsenal
Meetze, Adam Colonel	U.S. Army
Merrill, Claude	OCCmlO
Merryman, Millard	General Tire & Rubber Co.
Messinger, David, Jr.	Beckman Instruments (Spinco Div.)
Milano, Robert J.	Millmaster Chemical Corps
Miller, Adelbert E.	U.S. Army Chemical Corps
Miller, Floyd L.	Esso Research & Engr. Co.
Miller, Leonard, Colonel	U.S. Army Chemical Corps
Mindler, Albert B.	Peaudler Permutit, Inc.
Moat, Donald	Leeds & Northrup Co.
Murray, Maurice Dr.	U.S. Army Chemical Corps, DA
Neff, Cole D.	U.S. Army Chemical Corps
Nolan, Philip	Fiarrand Optical Co., Inc.
Norman, Robert,	Auchincloss, Parker & Redpath
Obermayer, Arthur C., Dr.	Moleculon Consultants, Inc.
Ofner, Dr. A.	Hoffman-LaRoche, Inc.
Olmer, Francois	Operation Research, Inc.
Palmer, L. Calvin	Vulcan-Cincinnati, Inc.
Perry, Richard I.	Wigton-Abbott, Corp.
Pool, Leonard T.	FMC Inc.
Read, B. K.	Shell Chemical Co.
Rehm, R. H.	Union Carbide Co.
Reynolds, Robert B.	Federal Labs, Inc.
Rhodes, S. Richard	Koppers Co., Inc.
Richards, Alan G.,	Bell & Howell Research Center
Richardson, Roger, Dr.	Esso Research & Engr. Co.
Robinson, Radcliffe F.	Colgate-Palmolive Co.
Rook, Eugene C.	Blaw-Know Co.
Rosenfeld, David A.	U.S. Army Chemical Corps Engr. Cmd.
Rothchild, J. H.	Avco-Rad.
Saffer, C. M.	Thiokol Chemical Corp
Salmon, Chenery Colonel	AFCA-N.E. Chapter
Salmon, Ronald D.,	Booz-Aalen Applied Research
Sansbury, Roland L.	The Martin Co.
Sayre, Brig. Gen. C. L. (Ret.)	FMC, Inc.
Schambra, W. P.	Dow Chemical Co.
Schwab, John L.	General Motors Corp.
Schwimer, Joseph,	U.S.A. Chem. Corps Bio. Labs.
Sconce, James S.	Hooker Chemical Corp.
Searle, Col. Victor C.	Science Communication, Inc.
Sederis, A. J.	Hoffman-LaRoche, Inc.
Shadle, Charles F.	Shell Chemical Co.
Shaide, Lovell E.	Dept. of the Navy
Sharf, John M.	Armstrong Cork Co.
Shoemaker, Bernard H.	American Oil Co.
Shuman, Frank	Sun Oil Co.
Silver, Seymour D.	Chemical Research & Development Labs
Sims, Mearlin L.	FMC Inc.
Slack, Carstens	Phillips Petroleum Co.
Spiner, David	Ft. Detrick
Sprinkle, Marshall R.	Shell Chemical Co.
Staudhammer, Peter	Space Tech. Labs., Inc.
Stirewalt, Edw. N.	Analytic Services, Inc.
Stoops, James A.	Analytic Services, Inc.
Strom, Lt. Col. F. I.	Charles Pfizer & Co., Inc.
Stubbs, Maj./General Marshal	The Chief Chemical Officer, U.S.A.
Summerson, W. H.	U.S. Army Chemical Corps
Swanson, L. M.	Edo Corp.
Taylor, W. J.	Atlas Chemical Co.
Terry, Lewis I.	Dearborn Chemical Co.
Traub, John	U.S. Army Chemical Corps
Turnock, L. C., Jr.	Technical Service, Inc.
VanMater, Blinn,	Human Sciences Research, Inc.
Visconti, Charles	U.S. Army Chemical Corps
Wachs, Heman Dr.	FMC Inc.
Wachtel, Dr. W. L.	Olin-Mathieson Chemical Corp.
Waldo, Frank	Pittsburgh Plate Glass Co.
Walsh, Leo	Office, Chief Chemical Officer
Walsh, Paul J.	Chemical Corps.
Warner, Graeme W.	U.S.A. Rocky Mountain Arsenal
Warnsker, Harry A.	United-Carr Fastner Corp.
Warnes, M. A.	Koppers Co. Inc.
Watkins, Wm. F.,	Olin-Mathieson Chemical Corp.
Weiford, L. Douglas	Stauffer Chemical Co.
Weiss, Edward L.	Leeds & Northrup Co.
Weiss, Francis Dr.	Library of Congress
Willard, Gradon	Pittsburgh Chemical Co.
Wilson, Douglas E.	Chemical Corps
Wilson, Wm. G.	Kimberly-Clark Corp.
Wingate, George	Goodyear Tire & Rubber Co.
Winslow, Walter G.	Aerojet-General Corp.
Wirth, Harold E.	Firestone Tire & Rubber Co.
Wintermoyer, John P.	Dept. of the Navy
Wolf, Walter A.	Celanese Corp. of America
Wright, Maurice H.	U. S. Rubber Co.
Yanka, Donald E., Col.	CmCl R & D Labs.

 Continued from page 13

bers of our present forces, but we are accelerating research and development of highly specialized equipment for their use. By so doing we are improving our own capabilities in this field and at the same time we are making a major increase in the training, assistance, operational advice, and equipment to our allies world-wide. These increased efforts in support of our allies will be important in assisting them to combat subversion and guerrilla warfare which—in many countries —continue to threaten seriously their internal security and political stability.

None of these organizational innovations, alone, will produce the required readiness for modern combat. Inasmuch as we do not hope to compete on a man-to-man basis, we depend on technological supremacy to compensate for numerical manpower inferiority. We must have more competent leadership, be better organized, more adequately trained and with equipment superior to those who would employ military force against us. We need weapons and equipment—the most modern that our ingenuity and technological skill can devise. It is as necessary to move forward in material modernization as it is to continue our emphasis on training the world's most versatile and capable soldiers and units.

Modernization

Therefore, a parallel program for modernization of material is essential. These new divisions and their non-divisional support units must be provided with the very best in equipment if their full combat capability is to be realized. Specifically, improved aircraft, armored personnel carriers, self-propelled howitzers and other forms of conventional firepower, as well as the latest innovations in communications equipment—are necessary.

We **must** improve the basic efficiency of our equipment, but also, we must design it for all reasonable types of combat to be encountered in a wide variety of operational environments. There has always been a need for simple, rugged, lightweight weapons; man-portable, reliable sensors which can detect movement, including that of humans, under varying conditions of weather and terrain; and simple, secure long-range communications systems. These needs are even greater today.

These are just examples. There are many others, and the problem never seems to be solved.

Keeping up with such dynamic materiel requirements poses an extremely difficult problem for the military planner—but he can find solace in the fact that one of our most valuable assets—a leading source of strength in America—is our great industrial capability. This capability spans the gamut of science and industry—from basic research, through engineering design, to production and distribution.

We in the Army are fully mindful of our dependence on your imagination and talents to help us solve our materiel problems. Because of your technical competence, I hesitate to suggest areas which we might emphasize with mutual profit.

First, each of us must do our utmost to insure that the important technological breakthroughs of the future become ours—and not those of our potential enemies.

Second, it is important that we provide our troops with equipment which is qualitatively superior to that of our enemies. We should never require American soldiers to enter combat with less than the best we can provide.

Third, both industrial and military research and development should devote increased effort in the exploitation of the new frontiers found in basic research. I know that industry has advanced many highly imaginative proposals to the Army. In consonance therewith, our military planners are attempting to provide proper guidance to industry's research and development community on the Army's needs for new weapons and equipment. This exchange of ideas among military planners and our teammates in industry is vitally important to our military preparedness.

Last, we must continue to work together in reducing over-all lead time to the absolute minimum. This factor is particularly important in the present era of scientific and technological growth—a period in which we cannot afford to lag behind in translating good research ideas into functioning military hardware.

In Closing

Gentleman, in closing I should like to restate my pleasure for this opportunity to meet with you.

You—the leader's of industry—and we in the military must continue our close association to insure that our military forces are fully adequate to the tasks ahead. Our national security depends as never before upon your imagination and boldness.

I assure you that the Army and the other services are doing their utmost to provide the **balanced** military posture needed. I am confident that each member of the Armed Forces Chemical Association is also doing his part.

New Development

by Rear Admiral K. S. Masterson

It is a pleasure to be with you today. Chemistry deals with the study of matter or, in other words, as John Read has written, "The character of the 'stuff' of which the universe is composed."

This covers a very wide field, as you members of the Armed Forces Chemical Association know. It is no accident that more than 50 per cent of the physical scientists of this country are in chemistry or bio-chemistry fields.

We in the Services owe so much to the past and present work of chemists that adequate words are not available to express the extent to which modern warfare—yes, even modern living—has come to depend upon chemistry. Our ships, aircraft, weapon systems, clothing, food, water, and fuels are all products of laboratories; and in the case of high altitude flight and low altitude submerged operations, even the air we breathe is chemically made or purified.

The subject shall discuss with you has a most important bearing on our present Navy, and our Navy of tomorrow—"New Developments."

The entire Navy Research, Development, Test, and Evaluation Program is directed toward the support of the Navy's mission: To control the seas, and to project U. S. Power overseas coordinated and in conjunction with our sister Services and our Allies in war situations of all types from limited war to the full spectrum of conflict.

The accomplishment of these missions by the Navy requires a continued broad effort in research and development in almost every field of science and technology. This is mandatory because of the many and diverse offensive and defensive operations which the Navy and Marine Corps must at all times be prepared to carry out in the air, on the sea, under the sea, and on the beaches. These functions require that we have the power to act with speed, precision and graduated pressure, plus the strength to stay where we are needed for as long as we are needed.

In carrying out these functions, ships and naval planes must be able to perform in many roles. For example, destroyers may operate in company with carriers, or with cruisers, or amphibious forces or mobile logistics forces, or as convoy escorts. They may engage in antisubmarine, antiair or antisurface ship combat, shore bombardment, or they may provide gunfire support for troops. They must be prepared to do any or all of these at all times. Naval aircraft must have a similar versatility: Fighters may be called upon to clear the way for attack, conduct preassault strikes in amphibious operations, or provide close air support for troops.

In order to insure that the Navy maintains these essential capabilities in the future, it is our job in Research, Development, Test, and Evaluation to update the existing vehicles, weapons, and other equipment as required by the threat and as tempered by the means. At the same time, we must look to the future, ever seeking follow-on items

for existing aircraft, missiles, sonars, weapons, and other equipments needed to replace worn out or outdated hardware. We must predict world conditions and navel requirements of the future. We must keep abreast of the status of the art in all technical fields. Using this as a base, we must predict the kinds of weapon systems, weapon vehicles, and force combinations that will be required and that can be developed to meet those requirements. As you know, the job is not an easy one.

A large amount of the Navy's Research, Development, Test, and Evaluation effort is in the basic research area where we are helping to broaden the base of the fundamental knowledge of the world in all areas of science and technology. A large percentage goes into oceanography studying the environment that supports our strength. A large percentage goes to exploratory development to find better components or better ways to apply known techniques to fabrication, production, or combinations for use. These efforts are tied closely to the efforts of Fleet and Navy Department long-range thinkers and planners in looking for the best avenues of approach toward weapon characteristics and vehicle types required to meet future conditions. The result of these continual studies and evaluations may result, in the future, in new and revolutionary weapon systems, such as POLARIS which was initiated in 1955, or in lesser weapon system changes. But we do live in a day-to-day era of quantum jumps to the new and rapid improvement to the old—today. We ignore either—at our nation's peril.

Navy Forces

Due to the time and cost involved in replacing Navy ships and planes, there will be no revolutionary change in the types of these in the Navy of the sixties. We can best categorize those forces that will comprise the Navy for the next decade as follows:

POLARIS—the Fleet Ballistic Missile-submarine system and one of the keys to the U. S. assurred retaliatory capability. New and improved missiles are to be provided as required and the submarine systems will have all future advances in communication, navigation, etc.

Our surface striking forces—whose power is vested in the manned aircraft of the carrier plus the guns and missiles of cruisers and destroyers—will continue to be an essential demonstration to the people around the world of our readiness to meet aggression whenever it may occur.

These carrier striking forces have repeatedly demonstrated that their mobility and flexibility represent one of our nation's most useful immediate assets in a limited war situation. Carrier task force mobility and flexibility also result in a significant capability in the event of a general or all-out war.

On the other side of the coin, guided missiles and antiair warfare missiles systems are providing our destroyers, cruisers, and our latest aircraft carrier with a hitherto undreamed of degree of effectiveness against the ever present threat of air attack.

Our antisubmarine warfare forces will remain our most sizable force during this period. They simply must provide the necessary capabilities to protect our commerce, and keep the ocean areas open for our own forces.

The amphibious forces will continue to be foremost in our naval planning to provide the means whereby we are able to meet the threats of limited wars. Ships and equipment that engage in amphibious operations are bing modernized and improved to make them more efficient and better able to carry out their mission.

Naval Power

With incipient trouble in Lebanon and on that country's request, it was the prompt presence of our wonderful Marines followed by other U. S. Forces that rapidly stabilized the situation. The ability to land forces within a matter of hours remains one of our most important national assets to deter aggression by nibbling.

Added to the foregoing major elements of naval power are the support forces, including the valiant mine-sweepers, who frequently must precede their larger sister to the beach. The mobile logistics support provided by our tankers and supply ships permits the power of our deterrent forces, our striking forces, and our amphibious forces to stay at sea with minimum dependence upon shore-based support. Logistic support forces have frequently been called the Navy's hidden weapon and they are indeed just that.

In the foreseeable future, it is hard to anticipate a fundamental change in the functions of the naval forces that I have just described. But the faces of these forces are changing rapidly with the new developments of our exploding technology.

In the field of propulsion, the Navy has today a position of preeminence in the development and use of atomic power. The reliability of these plants and their lack of dependence on oxygen and fuel oil have provided the Navy with a dramatically improved military capability.

Time does not permit me to take you on a shopping tour of the many new developments that the Navy's Research Development Program is producing in the field of chemistry and allied sciences, so I shall limit my remaining remarks to areas of interest to this group.

Chemical technology enters into just about every operation in which the Navy as well as other branches of the Armed Forces are engaged and crosses over just about every other discipline.

Many tasks or sub-projects conducted by universities and industrial and government laboratories, are supported by the Navy. I shall mention the progress that has been reported from only a few.

A new class of additives has been applied to existing silicone oils which resulted in an 800 to 1,000 fold increase in their useful life at temperatures of 500° to 600°F.

Nuclear Subs

In regard to habitability of nuclear-powered submarines, considerable progress has been made in the major efforts of developing:

(a) Continuous processes for the electrolytic generation of oxygen from water, including the sulfate-cycle system which also entails the absorbtion of carbon dioxide;

(b) Semigloss water-thinned paints which reduce the hydrocarbon contamination levels, and

(c) Practical installation of additional electrostatic-precipitator capacity for drastically curtailing the atmospheric concentration of aerosols arising chiefly from smoking.

A chemical cleaning solution has been developed for the removal of fuel oil and other contaminants from elecronic and electrical equipment. The cleaning technique has proven so effective that it is now believed that 90 per cent of such damaged equipment can be restored by regular ship damage control teams, resulting in considerable savings to the government.

Solid and liquid propellants were being developed in 1938 at the Cal. Tech. for rockets and assisted take-off. Typical solid propellant rockets at that time were the short duration ballisite propellant artillery rockets and long duration galcit asphaltic propellant rockets.

Since World War II this country has shown a growing interest in propellants and high energy fuels.

An example of eventual pay-off in terms of naval operations of long-range research programs is the research in nitro-aliphatic chemistry intiated in 1947. That program has resulted, 13 years later, in a contract to produce 210 tons of nitro plasticizers per year for solid propellants in advanced POLARIS missiles.

Newly developed gelling techniques have improved the storage handling and safety characteristics of liquid propellants. The addition of a small amount of the gelling compound converts storable liquid oxidizers and fuels to a gel which reverts back to fluid form when pressure is applied to the mass. The use of this technique will avoid dangerous spills even when rocket and missile fuel tanks are accidentally ruptured.

A series of twelve volumes of graduate level books on high-speed aerodynamics and jet propulsion has been completed under a Navy program. Two of these volumes cover liquid propellant rocets and solid propellant rockets and are available on the open market as No. 1 and No. 2, respectively, Princeton Aeronautical paperbacks.

Synthetic mica has been developed which is far superior thermally to the natural material. Synthetic mica-ceramic exhibit equal electrical insulating characteristics and have better chemical stability at high temperatures than similar products made from natural mica.

Structurally reinforced plastics are being applied successfully to various structural uses such as tanks, superstructures, small boats, satellites, etc.

Nickel and cobalt base alloys have been developed suitable for use in stressed applications at temperatures of 1700°-1800°F.

Molybdenum and columbium base alloys have been developed superior in strength to other available alloys at temperatures of 2000°-2600°F.

Viton rubber is a newly developed material impervious to petroleum products and phosphate ester fluids. It has a use in high temperature applications. One example is condenser expansion joints in nuclear submarines at 400°F.

An extremely ductile vanadium alloy which can be cold rolled to sheet form has been developed. This new alloy can be arc welded and is capable of being bent cold through the welded zone without cracking. Being lighter than any of the super alloys and the refactory metals now in use, it promises superior strength-to-weight advantages in the neighborhood of 2000°F.

Beryllium

A high purity beryllium has been developed that exhibits an improved ductility of many times that of any beryllium produced thus far. Studies have revealed that the use of beryllium in a high performance missile, for example, could reduce the overall gross weight by as much as 30 per cent in an extreme case.

A family of inorganic materials has been found that, when dispersed in a transparent plastic matrix, provides a transparent system, yet, when exposed to heat or light, or both, above a threshold energy level, the entire system becomes instantaneously opaque. Removal of the energy flux allows the system to revert to transparancy. This discovery holds great promise of making possible goggles and port-hole covers which can provide automatic protection from blinding effects of nuclear weapon blasts.

In the past few years much attention has been given to the probelm of converting primary energy directly to electrical energy, bypassing the heat source, heat engine, and electrical generator. The direct energy conversion processes receiving the majority of attention are: thermoelectricity, thermionic emission, magnetohydrodynamics, all using either nuclear or solar as the primary source of energy, and fuel cells using chemical energy as the primary source.

A 5 kw experimental thermoelectric generator has been built and tested. This is a water-cooled generator in which the thermalenergy of combustion of kerosene or other fuel oils is converted directly into useful electric power.

The present state-of-the-art in materials development indicates thermoelectric P and N materials exist that operate from 300°K to 1300°K and yield an overall theoretical efficiency of approximately 18 per cent. The best actual thermal efficiency of a physically constructed device is between 6 per cent and 10 per cent operating between 950°K and 300°K. Specific powers of two watts/lb. have been obtained and 10 watts/lb. to 12 watts/lb. are feasible.

Thermoelectric conversion is now technically feasible in submarine air conditioning, food storage, missile compartment temperature control. It may be economically competitive for military applications in about two years.

Both solar and nuclear heated thermoelectric systems look promising for space power supplies in ranges of a few hundred to a few thousand watts.

The most promising long lived remote application in sight for nuclear thermoelectric systems is deep sea operation in about 100 kw power size.

Outboard packaged power with 5 per cent efficiency and 100 kw can be visualized immediately for supplying small amounts of silent power.

The fuel cell which may be defined as a continuous feed primary battery in which chemical energy is converted to electrical energy, is inherently efficient. Interest in fuel cells utilizing fuels other than coal has increased markedly. It now appears that means and materials are at hand to carry the fuel cell into technological practice. Fuel cells operating on hydrogen and oxygen are more advanced technologically than other fuel cells under development today.

There is little doubt that fuel cells will be one of the important power sources of the future. Their potential for efficient utilization of fuel, compactness, simplicity, silent operation, and possible absence of noxious products in the exhaust makes it worthwhile for government and industry to pursue their development as vigorously as available skilled manpower permits.

Working fuel cells batteries with significantly improved performance may be expected to become available in two to five years, with the effort now being expended by government and industry.

The chief engineering problems associated with the development of fuel cell systems are the storage and transport of fuel and oxidizer, and disposal of exhaust products. For high temperature fuel cells material problems are of paramount importance.

The achievement of a technological competitive position for fuel cells appears to depend on development of a fuel cell that will operate on conventional fuels rather than hydrogen. A low temperature system that would consume a carbon containing fuel (preferably hydro-carbon) and reject carbon dioxide essentially free from toxic products would find wide acceptance. Much research in this direction is under way.

Thermoelectricity, thermionics, and the fuel cell produce direct current and are basically low-voltage, high current devices. In utilizing the power produced by these methods, the low-voltage has been a problem, solved only, in present practice, by connecting many basic units in series.

A static inverter has been developed at the Naval Research Laboratory which converts the low d-c output voltages, generated by the new energy conversion methods, to higher a-c or d-c levels.

This new inverter makes possible the design of simpler, more rugged, and more efficient power sources, and contributes to a greater reliability for the overall power supply.

In June a 79-foot THOR-ABLE-STAR rocket was launched from Cape Canaveral, Fla. with three satellites in its nose. The three satellites were designed to be separated once they reached outer space. Separation was completed by the Navy's TRANSIT IV-A navigation satellite, but NRL's GREB III and ONR's INJUN are orbiting in combination.

The nuclear reactor of the U.S. Naval Research Laboratory, the most powerful research reactor in the Washington, D. C. area and the first to be built in a Department of Defense installation, was recently modified from a 100 kw to a one megawatt power level. This reactor has operated successfully and safely since 1956 under AEC license. The increase in power will provide approximately a 10-fold increase in nutron flux and therefore will accelerate data taken in existing nuclear and solid state physics program.

We in your Navy have a very large job to do. It takes very large numbers of ships and aircraft to do it. We must select that optimum balance for those vehicles with as much multi-purpose

Continued on page 44

Address by

Edward A. McDermott
Deputy Director
OCDM

I APPRECIATE this opportunity to speak at this 16th annual meeting of the Armed Forces Chemical Association.

As leaders of American industry with a primary concern for national defense you have a long-standing and deep interest in problems of emergency planning. You can appreciate better than most Americans the critical juncture at which the United States now stands. The forces of freedom have never been more sorely taxed than today. And the consequences of open and armed hostility were never more cataclysmic than today.

The Kremlin knows this as well as we do. Recent events would seem to indicate that they are banking on this backdrop of widespread devastation if war should come, to browbeat the free world alliance into retreat. There can be no doubt that the Berlin crisis was made in Moscow, and is designed to test our resolve in meeting our commitments. It would be unfortunate if the Soviets chose not to take us at our word, for President Kennedy emphatically meant what he said with respect to our obligations to West Berlin.

On the matter of nuclear testing, we can only regard the recent Soviet decision to break a three-year moratorium as another sorry example of the double talk and deceit which has characterized their attitude in the past. Their decision to explode nuclear weapons above ground further charges an already tense international scene, but also increases the dangers of fallout across the globe. Some of us would like to find some comfort in the interpretation that deficiencies in their nuclear weapons development compelled them to resume these tests in defiance of world opinion. But even so, any thoughtful observer must look upon this decision with shock and disgust.

Whatever their reasons for this provocative action, the United States has no choice but to assure its own safety and security. To this end the President has reluctantly announced our intention to conduct underground tests which do not deposit fallout in the atmosphere.

At the same time, the United States joined Great Britain in proposing to the Soviets a formal treaty to ban above-ground nuclear tests. These tests can be detected by available methods without an on-site inspection system. The Soviet response was negative.

It is a sorry terminal point to three years of

negotiations. It leads one to ask whether the Soviets had the slightest intention of coming to grips with this problem or whether they found in these meetings a springboard for propaganda and an excellent means of stalling.

I will leave this judgment to the American people who, unlike the Soviet people, have been kept fully informed of every stage of these negotiations.

Whatever else might be culled from the dismal Soviet record, it is abundantly clear that the seductive phrase "peaceful coexistence" means to the Soviet leadership peaceful conquest if possible and threats and bluster if necessary. Unfortunately, the Soviet brand of "powder keg politics" is not always manageable. It may be calculated and deliberate at first, but it can get out of hand. That is the danger we face today.

Nothing must reduce our ability to act affirmatively whenever these provocations occur. It is the one way to discourage such tactics and to keep them from escalating. By this I mean that we must be prepared not only for a quick and devastating response to nuclear attack; we must be ready to fight small wars when our security is at stake. If we are not so prepared we could be confronted with a series of piecemeal surrenders, a nibbling at the fringes of free world strength, a recurring test of our national will. Prepared to deal with only one kind of war, the kind that is likely to be of short duration, we could well find ourselves unable to deal with other threats which, over the long run, could destroy us.

These objectives underlay the new emphasis on emergency planning and preparedness programs—an intensified effort to develop realistic and effective responses to the perils and hazards of life on this globe.

Review

For eight months, Mr. Ellis has been engaged, at the President's direction, in a thoroughgoing review of every aspect of civil defense and mobilization planning. This investigation culminated with Mr. Ellis' recommendation to transfer major operational functions of civil defense to the Department of Defense.

This decision was not taken lightly. We realized that many of these functions had been traditionally identified as civilian in nature and, in fact, were called nonmilitary defense. But it was necessary to consider the mounting crisis in the world and the imperative of making optimum use of Federal agencies possessing vast facilities which had not been sufficiently utilized in civil defense activities. The upshot was that operational responsibility for shelter, radiological, chemical and biological defense and the national warning network, has been transferred to the Department of Defense. At the same time, the Office of Emergency Planning has been established in the Executive Office of the President. The Director of this office acting on behalf of the President, will, exercise a central coordinating authority over the total civil defense program. He will maintain continuous liaison with States and local governments to assure that all phases of the program are meshed and moving in concert and he will have a special responsibility for mobilizing support throughout the Nation. He will continue to be responsible for the establishment of continuity of government programs at the State and Federal level.

Most Important

I cannot over-estimate the importance of this work. To carry on as a Nation in the wake of an attack we must be certain that Government survives as an operating entity. Accordingly, we have been developing for several years emergency relocation sites to enable Federal agencis to carry out essential functions in time of war. Such facilities now exist in a vast arc near Washington.

Of course this raises a question. If Washington is attacked without warning, and there is no opportunity to reach relocation sites, will the Federal establishment continue to function? The answer is to set up lines of succession and small cadres located permanently at these sites. It is not an easy task, but neither is it an impossible one.

We also recognize that in the first days after attack the real job of survival will be accomplished at the local level. Make no mistake about it. Cities and States may well be isolated for a period of time, and our society is likely to be segmented by the attack. So we have been working to extend continuity of government programs to State and local governments. The results of this effort have been gratifying indeed. At this date, 45 States have adopted some continuity of government measures and 29 States have approved amendments to State constiutions for this purpose.

The new structure of emergency planning will satisfy another vital requirement which has been paid insufficient attention in recent years. I refer to the mobilization planning conducted on a continuing basis to assure that our Nation's resources of manpower and material are ready for any contingency. This involves both a healthy and growing economy, **plus** an economy capable of meeting specific national security requirements. Historically, the economy of the United States has expanded at a rate of about 3 per cent a year. This economic groth, impressive as it has been, nevertheless is slower than the rate of growth achieved by the heavily regimented Soviet economy.

But this faster rate of growth by the Soviets should not, by any means, be taken at face value. It must be remembered that we start from a much higher level and the Soviet rate is likely to recede as their base becomes broader.

Nevertheless, President Kennedy is convinced that our system is capable of growing at a faster rate than in recent years. So am I.

But the present superiority of our economy does not necessarily reflect its state of health from the standpoint of mobilization planning. To be sure, an economy mobilized for war can be more effective than a stronger economy that is not so geared. That is the basic problem we must tackle. I think you are aware of the restrictions on civilian production in the Soviet Union. Under strict regimentation, their economy diverts a larger portion of available resources and technical know-how to the military fields.

Free Society

It is much more difficult in a free society to maintain a mobilization base that matches the needs of protracted cold war, the possibility of limited conflict, or the unprecedented disruption and devastation of a nuclear holocaust.

It is much more difficult, but we must do it. Two ways of life are in contention. We are dedicated to the concept that the state exists to serve the individual. The communists believe that the individual must be sacrificed to the state.

Our economy must be geared for this struggle. We must be ready to compete against a nation which manipulates its resources with complete disregard for human life. In short, we must be able to accomplish through cooperation what the communists do through coercion.

In this regard, let us never forget that our military establishment is only as good as the industrial plant and manpower that feeds equipment and supplies. We must keep a constant and accurate inventory of what we have. At all times we must know what we can depend on if we are attacked. We must devise the best ways of assuring a quick recovery, and we must revise our methods whenever technological advances so dictate. Part of this activity hinges on our resource evaluation center and the capability of intricate computers to give us prompt and accurate answers.

As you can well understand, economic mobilization and the management of our national resources can never be static if national security is to be served. In a very literal sense, it is an around-the-clock affair.

In this respect, the merger of FCDA and ODM, which occurred in 1958, never really jelled. I am constrained to say that what might have looked desirable on paper did not work out in practice. For three years the mobilization and management of our resources, and this included the critical planning for economic stabilization, was given something less than the attention it deserves. It is not my purpose to assign blame for this unfortunate development. But clearly the civil defense operational functions took precedence over these planning and policy-making activities. My own feeling is that resource development can no longer receive short shrift. We must be able to anticipate our needs of critical and strategic materials with unprecedented precision.

Take our strategic stockpiles, for instance. Our industries are dependent to a great extent on basic materials obtained abroad. If an international eruption should choke off, or even significantly shrink this supply line, our factories, our production lines, and in the final reckoning, our military establishment, would be adversely affected. We simply cannot afford to allow this to happen.

Accordingly, there is good reason to rejoice in the make-up of the Office of Emergency Planing.

I believe it will give us the machinery to set in motion the kind of nationwide effort which can build a posture of preparedness on the home front capable of meeting any and all emergencies.

This new structure will certainly not materialize overnight. But the groundwork has been laid for a sturdy and sound home defense. I anticipate that OEP will develop a close working relationship with the Secretary of Defense in his execution of operational functions assigned to his Department.

Most important, I believe the necessity for a civil defense worthy of the name has been brought home to every American citizen. In the coming months, I expect an accelerated program to inform the American people of individual and community responsibility, and I think much of this activity will carry not only the endorsement, but the personal stamp of approval of the President of the United States.

Palladium Ammonium Chloride, Palladium Black
Aldehyde, Palmitoleic Acid, Palmitoyl Chlori
Pectinolytic Enzymes, Pellidol,
OVER 20,000
CHEMICALS IN
STOCK!
Write for Our New 138-Page Catalog!
DELTA CHEMICAL WORKS, Inc.
23 West 60th St. New York 23, N. Y. PLaza 7-6317

ADMIRAL MASTERSON **Continued from page 40**

flexibility as we can afford—we cannot do all the jobs with aircraft, we cannot do them all with ships, and we cannot do them all with submarines. Each type must be used—integrated with the other types to exploit the best potential of each where it can be most effective at the least cost.

The problems that confront the Navy are problems for all of us. It is necessary that with the many distracting and dramatic advances of modern science of which the chemical field is a leader that the world be kept aware of the importance of seapower and its essential contribution to our national survival. It is in this field that your responsibilities lie and your efforts are so necessary. We, as Navy men and as responsible citizens, are most grateful for your efforts.

DIED

Sterling Ely, Washington representative of Union Carbide Corporation, who collapsed at his home. Mr. Ely who graduated from the University of Maryland in 1921 was 62 years of age. He was a research chemist and a legal consultant as he had also received his law degree. He had joined Union Carbide in 1944 and had been previously associated with other chemical companies. He was a former president of the University Club in Washington, a member of the American Chemical Society, American Bar Association and the American Judicature Society. He is survived by his wife and a daughter and son all of Washington.

Vincent O'Konek, manager of the Manger-Hamilton Hotel in Washington and former banquet chef at the Statler there, of cancer at 44 years of age. He fought on Okinawa and in Korea and went to the Statler from his Army service. He was a native of Minnesota and attended Marquette University.

John G. Holland who was the chief investigator for the Senate hearings of the Walsh Committee into the Teapot Dome oil scandal of the Harding Administration. Holland, who was 61 at the time of his death, was born in Butte, Montana, and worked as clerk in the office of Senator Walsh from that state. He graduated from Georgetown Law School while with the Senator. Old timers around the Press Club shake their heads at the mention of his name. He alone made the preliminary investigation for the Tea Pot Dome hearings, and those who knew him recall that the Secretary of the Navy sent him a wagon load of documents when asked to supply facts about the oil leases. The investigation was stimulated, reporters say, by a Junior Naval Officer who complained that all wasn't well with Navy's oil reserves at Tea Pot Dome.

McDERMOTT **Continued from page 43**

I have consistently maintained that firm Presidential leadership would persuade our people to take this initiative. Congressional action recently completed on the total program confirms this view. The Congress appropriated $294,150,000 for mobilization planning and civil defense, roughly five times last year's appropriation. This total includes most of the original OCDM request, plus more than $207 million asked by the Department of Defense to carry out operational activities delegated by the President.

Thus, we have made an excellent beginning.

We must build on this momentum. And we must not expect the Federal Government to do the whole job. As President Kennedy said in his July 25th address to the American people:

> "In contrast to our friends in Europe, the need for this kind of protection is new to our shores. But the time to start is now. In the coming months, I hope to let every citizen know what steps he can take without delay to protect his family in case of attack. I know you would not want to do less."

Such are the tasks and the toil we have cut out for ourselves. You will note that I said "ourselves." No American can afford to be indifferent to his personal responsibility. We shall ask of the individual citizen the vigorous support of local emergency planning and the protection of his family; we shall ask of industry the protection of its plant and property and cooperation in developing dependable supplies of critical military hardware and civilian goods; we shall ask of communities the strengthening of survival plans, the construction and stocking of shelter facilities, and measures to protect essential functions of government; we shall ask of voluntary organizations the full weight of their prestige and membership behind a program of total preparedness. We shall ask of our clergy of all faiths the support of their congregations in what is a spiritual obligation basic to our belief in the inherent rights of the individual citizen.

In plain fact, we shall strive to marshall our total resources, spiritual and material, to protect our way of life and to preserve the institutions and the fruits of freedom.

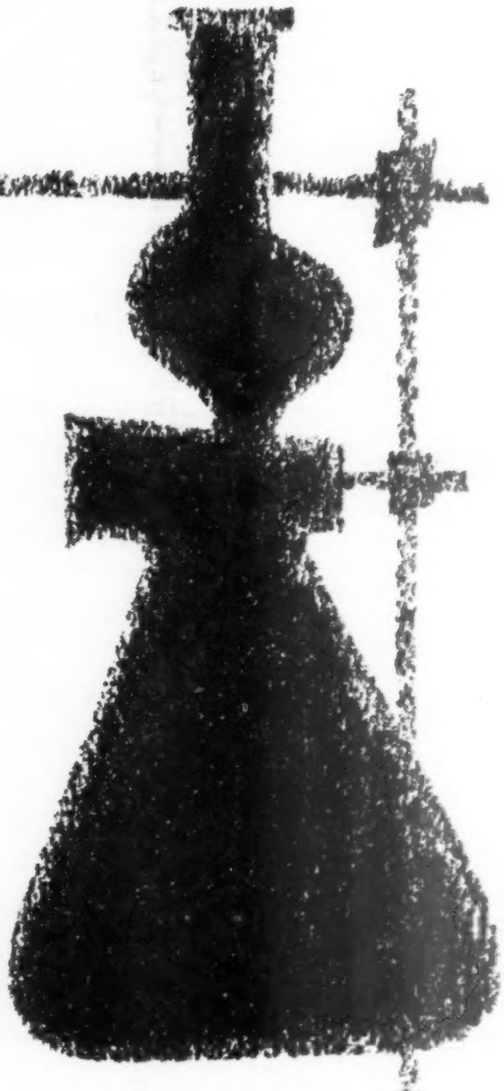
GROUP AND SUSTAINING MEMBERS

OF THE ARMED FORCES CHEMICAL ASSOCIATION

Adache Associates, Inc., Engineers, Cleveland, Ohio
Aerojet General Corporation, Downey, Calif.
Aircraft Armaments, Inc., Cockeyville, Md.
Air Reduction Company, Inc., New York, N.Y.
Allied Chemical Corporation, New York, N.Y.
American Cyanamid Company, New York, N.Y.
American Oil Company, Chicago, Ill.
American Potash & Chemical Corporation, 300 West Sixth St., Los Angeles 54, Calif.
American Zinc, Lead & Smelting Co., St. Louis, Mo.
Analytic Services, Inc., 5202 Leesburg Pike, Alexandria, Va.
Armstrong Cork Company, Lancaster, Pa.
Astra Pharmaceutical Products, Inc., Worcester 6, Mass.
Atlas Chemical Industries, Inc., Wilmington, Delaware.
Avco Corporation, 750 Third Ave., New York 17, N.Y.
Barnebey-Cheney Company, Columbus, Ohio
Bechtel Corporation, San Francisco, Calif.
Beckman Instruments, Inc., 2500 Harbor Boulevard, Fullerton, Calif.
Blaw-Knox Company, Pittsburgh, Pa.
Booz-Allen Applied Research, Inc., 4921 Auburn Ave., Bethesda, Md.
Brothers Chemical Company, 575 Forest St., Orange, N.J.
Brown Company, 150 Causeway St., Boston, Mass.
Carter Products, New York City
Celanese Corporation of America, New York, N.Y.
Chase Manhattan Bank, The, 20 Pine Street, New York, N.Y.
Columbia Southern Chemicals—Chemicals Division of Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Pa.
Commercial Solvents Corporation, New York 16, N.Y.
Continental Oil Co., Ponca City, Okla.
Controls for Radiation, Inc., 130 Alewife Brook Parkway, Cambridge 40, Mass.
Diamond Alkali Company, Cleveland, Ohio
Dow Chemical Company, Midland, Mich.
E. I. duPont de Nemours & Co., Inc., Wilmington, Del.
Edo Corporation, College Point, N.Y.
Engelhard Industries, Newark, N.J.
Esso Research and Engineering Co., Linden, N.J.
Ethyl Corporation, Baton Rouge, La.
Evans Research & Development Corp., New York, N.Y.
Federal Laboratories, Inc., Saltsburg, Pa.
Ferguson, H. K., Company, The, Cleveland, Ohio
Ferro Corporation, Cleveland, Ohio
Firestone Rubber and Latex Division of Firestone Tire & Rubber Co., Fall River, Mass.
First National City Bank, 55 Wall St., New York 15, N.Y.
Fisher Price Toys, Inc., East Aurora, N.Y.
Fisher Scientific Co., New York, N.Y.
Fluor Corporation, Lt., The, Whittier, Calif.
FMC Corporation, 161 E. 42nd St., New York City 17
Fraser & Johnston Co., San Francisco, Calif.
General Aniline & Film Corporation, New York, N.Y.
General Electric Company, Chemical & Metallurgical Division, Bridgeport, Conn.
General Tire & Rubber Company, The, Wabash, Ind.
Goodrich, B. F., Chemical Company, Cleveland, Ohio
Harshaw Chemical Company, The, Cleveland, Ohio
Harvey Aluminum, Torrance, Calif.
Hercules Powder Company, Wilmington, Del.
Heyden Newport Chemical Corporation, New York, N.Y.
Hoffman-La Roche, Inc., Nutley 10, N.J.
Hooker Chemical Corporation, Niagara Falls, N.Y.
Industrial Rubber Goods Company, St. Joseph, Mich.
International Nickel Co., Inc., New York, N.Y.
International Salt Co., Clarks Summit, Pa.
Kennecott Copper Corporation, New York, N.Y.
Koppers Company, Inc., Pittsburgh, Pa.
Lambert-Hudnut Mfg., Laboratories, Inc., Lititz, Pa. subsidiary of Warner-Lambert Pharmaceutical Company, St. Louis, Mo.
Eli Lilly and Co., Indianapolis 6, Ind.
Little, Arthur D., Inc., Cambridge, Mass.
Lummus Company, The, 385 Madison Ave., New York 17, N.Y.
The Martin Company, Baltimore 3, Md.
Melpar, Incorporated, 3000 Arlington Blvd., Falls Church, Va.
Merck & Company, Inc., Rahway, N.J.
Millmaster Chemical Corporation, 99 Park Ave., New York 16, N.Y.
Mine Safety Appliances Co., Pittsburgh, Pa.
Monsanto Chemical Company, St. Louis, Mo.
National Lead Co., 111 Broadway, New York 6, N.Y.
Niagara Blower Co., New York, N.Y.
North American Aviation, Inc., Los Angeles, Calif.
Olin Mathieson Chemical Corp., 10 Light St., Baltimore, Md.
Pemco Corporation, Baltimore, Md.
Pennsalt Chemicals Corporation, Philadelphia, Pa.
Pfaudler Company, a Division of Pfaudler Permutit, Inc., Rochester 3, N.Y.
Pfizer, Chas. & Company, Inc., Brooklyn, N.Y.
Phillips Petroleum Company, Bartlesville, Okla.
Pittsburgh Chemical Co., Pittsburgh, Pa.
Pittsburgh Plate Glass Company—Chemical Division (Columbia Southern Chemicals) One Gateway Center, Pittsburgh 22, Pa.
Procter & Gamble, Cincinnati, Ohio
Riegel Paper Corporation, 260 Madison Ave., New York 16, N.Y.
Shell Chemical Corp., Denver, Colo.
Shell Development Company, Emeryville, Calif.
Sheller Mfg. Co., Dryden Rubber Div., Chicago, Ill.
Shwayder Bros., Inc., Denver, Colo.
Standard Chlorine Chemical Company, Inc., South Kearney, N.J.
Stauffer Chemical Company, New York, N.Y.
Sun Oil Company, Philadelphia, Pa.
Union Carbide Corporation, New York, N.Y.
United-Carr Fastener Corp., Cambridge, Mass.
United States Borax & Chemical Corp., 630 Shatto Place, Los Angeles 5, Calif.
Universal Match Corp., Ferguson, Mo.
Vulcan-Cincinnati, Inc., 120 Sycamore St., Cincinnati 2, Ohio
Wigton-Abbott Corporation, 1225 South Avenue, Plainfield, N.J.
Wyandotte Chemicals Corp., Wyandotte, Mich.

Companies listed in bold face type are Sustaining Members

essential chemicals for all industries



chlorine
caustic soda
soda ash
sodium bicarbonate
caustic potash
solvents
ammonia
chrome chemicals
barium chemicals
sulfur chemicals
agricultural chemicals
reinforcing pigments
calcium chloride
muriatic acid
calcium hyporchlorite
hydrogen peroxide
titanium tetrachloride

columbia | southern chemicals
CHEMICAL DIVISION
PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA

Librarian
University of Michigan
Ann Arbor, Michigan